THE MARINE REVIEW

VOL. XXXIII. CLEVELAND, MARCH 29, 1906. No. 13.

## SALVING THE STEAMER PORTLAND.

Describing the operation of salving the wrecked steamer Portland which went ashore on Spire Island, Alaska, on Dec. 19 last, Mr. E. C. Genereaux, wrecking master of the Pacific Coast Salvage Association, said:

"When I first reached the Portland there was 615 tons of copper ore aboard, 450 tons in the forward hold 'tween decks, and the balance in the after hold 'tween decks. Before leaving for the Samson I requested Captain Linquist, of the Portland, to discharge as much ore as possible out of the ship in lighters, as they could work to advantage at low tide. At high tide and with a southerly wind the weather side of the hurricane deck was covered with water. After our arrival with the Samson, we got to work at once, and with the assistance of the crew of the Samson, those left on the Portland and one diver, we made good headway. The next day after arriving we got the boilers and pumps aboard and connected. For the following five days it snowed and at night it would freeze tight. This, with a northerly breeze, made slow progress. After the fifth day the wind veered to the southeast, melting the snow, and enabling us to start the pumps and get under way in earnest. After starting an eight-inch Morris pump and a ten-inch Gwynne pump we lowered the water sufficient to work most of the ore out of the forward hold during low tide. We did not touch the ore in the after hold, as we wished to get her bow as high out of water as possible.

"After an examination by the diver we found that the forefoot and part of the forward keel was entirely gone. The ship, running on a ledge of rocks, tore the forefoot clean out to the cants. The balance of the vessel seemed to be intact. At extreme low tide we were enabled to patch the forefoot for a distance of eight feet from the stem. It was impossible to get at the balance of the damage at this time, because of the vessel's position on the ledge of rocks. We did as much as we could under the circumstances. The diver caulked up a few butts and seams, which were not easily located, because of the copper sheathing on the ship.

"On the ninth day the ore was practically out. With the bow high in the air we made a canvas apron, 12 feet by 24 feet, and sewed four thicknesses together. With lace lines attached and weighted with lead, we secured one end of this to the bow just above the damage, and the other end we slipped down and drew taut under the bottom with tackles when the vessel lifted off the rocks. In the meantime four moorings had been placed, two from the bow and two from the stern, to hold the ship in position, so that if the first trial at floating the vessel proved a failure she would not alter her position. When the vessel floated and the canvas apron in position, the two pumps running to capacity just kept her free. With the assistance of the revenue cutter Rush and the tug Vigilant the Portland was towed to Sand Beach, opposite Ketchikan, nine miles north from Spire Island, arriving there Dec. 21. Here the vessel was beached to make temporary repairs.

"Owing to the cold snap experienced while salving the vessel, and not making much progress we lost the opportunity for good tides for making repairs, so had to lie ten days on the beach before the tides were favorable for repair work. In the meantime the ore in the forward hold had been discharged, so that the ship could be taken higher on the beach. The machinery was overhauled and found to be in fairly good condition. Steam was got up on the main boilers to run the pumps. The damaged portion of the forefoot and keel were cut away, and temporary repairs were made with plank and canvas. The copper was stripped away from the forward butts, and the same caulked and wedged as required. At this time we decided that the vessel could be steamed to Seattle to make repairs, but while stripping the asbestos from the main steam connections the distance piece connected with the boiler dome and main steam pipe was found to be cracked. This, of course, was attributed to the stranding of the vessel, but on making a more careful examination the slip joint to the main steam pipe was found frozen solid, which was the cause of the distance piece cracking. Had this been in good working order the distance piece would not have given way.

"Owing to the fact that no material could be obtained to make repairs to this damage I decided to send to Seattle for a tow boat, and the Pioneer was dispatched to the scene. We then decided to disconnect the thrush shaft from the crank, so that the wheel would revolve while we were being towed. After making temporary repairs and coming off the beach the wrecking pumps were not required, as one of the ship's own line pumps kept her free from water. The wrecking pumps and piping were overhauled, however, and kept in position if required.

"After we had been towing two days we decided to connect up the engine and main boilers with a two-inch pipe to try the main engine and discovered that this amount of steam gave most satisfactory results. The engine worked in splendid order. Steam was turned in at a pressure of 110 pounds, this being 17 pounds less than the pressure allowed, and a speed of 63 revolutions a minute was attained, much to our surprise. (The main steam pipe had a diameter of 7½ in.)

"We arrived in Seattle on Jan. 21, taking 6½ days to make 640 miles. There was a strong southeast wind during the passage, and we found it necessary on one occasion to anchor in Safety Cove for six hours on account of wind. We discharged the balance of ore in her hold in this city and took her to Winslow under her own steam, still having the two-inch pipe in use. Another method we thought of pursuing was to build a bulkhead in the lower hold, but owing to the amount of ore that was forward it would have

been too expensive to have taken this out with a diver. Had the damage been more serious, however, it would have been necessary to have pursued this course."

## LIVERPOOL SHIPPING LETTER.

Liverpool, March 19.—The British board of trade has decided on new regulations regarding the freeboard of various classes of ships, and from these new rules the ordinary cargo steamers will reap considerable benefit,—that is steamers not having spar or awning decks, and coming under Table A in the new rules. The advantage of strong superstructures will be allowed for, and compensating concessions in freeboard made. For large steamers to be allowed 6 in. on a load draught means an advantage which may not appear very great, but it is sufficient to make all the difference between profit and loss on a voyage, for in steamers of the ordinarily large cargo type, it might possibly mean up to an extra 275 tons. Already ship owners have taken steps to get the new load line assigned, and no delay will be made in giving those concerned the full and immediate advantage of the new regulations, seeing that they come into operation on March 20. As regards steamers, the chief justification for the reduction of freeboard allowed by the revised tables of freeboard is found in the consideration that vessels having a large proportion of the length covered with strong deck erections, may safely be loaded to a somewhat deeper draught than that allowed by the old tables, provided, that all hatchways or other openings in their decks have strong and efficient means for closing them. The Table A freeboards relating to cargo-carrying steam vessels not having spar or awning decks, remain the same as before up to a molded depth of 27 ft. 6 in., and are also the same for depths from 42 ft. 6 in. upwards, but there is a slight reduction for depths from 28 ft. to 42 ft. The Table B dealing with cargo spar deck vessels, leaves the freeboards unaltered. The Table C freeboards of cargo-carrying awning deck vessels have been reduced throughout, the reduction varying from 7 in. at a depth of 14 ft. to 13 in. at 34 ft. depth, and it has been necessary to provide an amended standard of strength for awning deck vessels. As the freeboards of steam vessels of all types having deck erections depend on the difference between the freeboards in Tables A and C, it has been necessary to amend the tables of percentage relating to deck erections in various types of vessel. Regarding well-deck steamers, in the case of large vessels having very long deck erections and only a short well, the reduction may amount to about 8 in., but in the majority of cases it will be less, and when the erections extend over less than say seven-tenths of the vessel's length, although some reduction will be due, it will be much less in amount. The full reduction allowed for this type of vessel is only to be given provided certain conditions are fulfilled with regard to the construction of long poops or bridge houses, and also with regard to the efficiency of the means of closing any openings in the bulkhead at the after end of the "well." In this connection it is worth noting that the amended tables for the first time make provision for the proper construction of hatchways in vessels of all types.

Vessels with poop bridge and forecastle disconnected, when of large size and having very long erections with two short wells, may obtain in some cases a reduction of 5 in., but ordinarily the reduction will be less, and when the erections are short, and the vessel not exceeding 28 ft. in depth, it will be small in amount. For vessels having forecastles and bridge houses, the reduction again will be very small in amount. In regard to vessels having a poop and forecastle, or poop only, or forecastle only, a distinction is now introduced between the case in which the machinery openings are protected by the poop or by a deck house, and that in which the openings are not so protected. In the former case there will usually be a slight reduction of freeboard, but in the latter case the freeboard will not be appreciably altered. Turret-deck steamers will in most cases obtain a reduction in freeboard, and vessels of the shelter deck type will generally obtain reductions similar in amount to vessels of well-deck type, but varying according to the number of openings in the shelter deck, and the means of closing these openings. Sailing vessels, lastly, having a molded depth exceeding 20 ft. will obtain a reduction in freeboard, and for those of the largest existing dimensions the reductions may amount to about 5 in. Vessels of less than 20 ft. depth will remain unaltered.

Prof. Biles in his fifth Keith lecture on the steam turbine in Edinburgh, referring to the question of the size of the blades, said that in channel steamers at the entrance, the length of curved blades is about 1½ in., and if all the steam were carried through one turbine the length of blades at the exit would be about 16 in., but when the blades have reached the length of about 4½ in. the steam is taken to two independent turbines, and begins its course with 1½-in. blades on drums enlarged one-third in diameter. The length of blades increasing to the exit end to about 8 in.

In high-speed Atlantic liners about 20 in. length of blade will be necessary. The determination of dimensions of turbine and blade was dealt with, and the general results obtained showed that efficiency of turbine increases with revolutions. The method of predicting the efficiency of propellers, diameter, pitch, and surface, as developed and applied to and compared with actual ships, shows that efficiency decreases with revolutions. The change from 6 ft. to 11 ft. diameter of propellers in a 9,000-H. P. steamer of 23 knots being associated with a decrease of revolutions from 600 to 200, and increase of efficiency from 0.68 to 0.75. Losses in a steam turbine partly depend on relation of revolutions and diameter, and are partly independent of them. Probably such a charge as the above indicated would involve loss of efficiency of about 20 per cent in the turbine, as against a gain of 7 per cent in the propeller. The weight and cost of the turbine would also be much greater. Results on trial of similar vessels designed by the lecturer show that at about 20 knots speed the turbine is about 14 per cent more efficient than the reciprocating engine vessel. The results on service do not confirm these, the turbine being less than one reciprocating vessel, and more than another. The problem to be solved is what is the cause of this falling off in efficiency at sea. Detailed figures of results of the running were given and investigations as to the increase of resistance met with at sea compared with that on trial, and the results show turbine vessels would have been more efficient performers at sea if they had been less efficient on trial, and the desire to obtain high-speed results on the measured mile has caused loss of efficiency on service. It is believed that this can be avoided in the future, and corrected in existing vessels. Prof. Biles gave many particularss of the details of turbines, and results both as to performances and weight, and indications were given of the direction in which improvements were being made. One turbine vessel on trial gave 10 per cent better results than the reciprocating engine vessel. The reciprocating propeller was 10 per cent better than that of the turbine driven vessel, showing that the turbine itself is 20 per cent more efficient than the reciprocating engine. A remarkable tribute to the mechanical efficiency of the turbine is given by the case of the Maheno, which steamed from the Clyde to Durban and from Durban to Melbourne without a stop, distances being 5,500 and 7,000 nautical miles. Turbine results on the Atlantic seem of the same character as those in channel steamers, the falling off compared with trial results being considerable. The future of the turbine said Prof. Biles is now well assured but its

results will be better when the experience of sea performances is applied.

Statistical tables of the traffic on the Suez canal in 1905 and the two preceding years have just been issued by the company. The total number of vessels that passed through the canal was in 1903, 3,761; 1904, 4,237; and in 1905, 4,116. The British flag was represented in the three years, respectively, by 2,278, 2,679, and 2,484 ships. The tonnage was in 1903, 16,615,309 tons gross; in 1904, 18,661,092 tons gross; and in 1905, 18,310,442 tons gross. The share of Britain being in 1903, 10,215,252 tons gross; in 1904, 12,164,591 tons gross; and in 1905, 11,505,796 tons gross, while the British tonnage declined in 1905, compared with 1904, the German and French increased, the former by 211,941 tons, and the latter by 104,518 tons.

The British admiralty has decided to take out a policy representing in value $50,000,000 to cover the nation's risk and liability, consequent on the inclusion of British merchant ships in the great scheme of naval maneuvers to be carried out next June. It is recognized that as the maneuvers will be carried out under conditions approximating as far as possible to suddenly arising warfare, the various vessels both naval and commercial, will be exposed to considerable risk, especially at night, when, as is probable, some vessels will be steaming without lights to evade capture. The rate mutually agreed upon between the admiralty and a committee of London underwriters is 3s 9d per cent, so that the premium payable by the admiralty will aggregate between $85,000 to $90,000. One-half of the whole policy has been allocated to members of Lloyds, while the other half has been offered to the large marine insurance companies in London and Liverpool. The policy covers damage to ships or cargoes, and in some quarters the opinion is expressed that the premium is not adequate to the risk, but the majority of the underwriters and insurance firms, it is said, will agree to be represented in the $50,000,000 policy, if only on patriotic grounds.

The February returns of the Manchester Ship Canal Company show receipts to be $169,500, against $142,930 in February last year, or an increase of $26,570. The total increase for the two months of the current year is $46,755.

## YARROW'S NEW YARD.

Considerable interest is attached to the general arrangement and constructional details of the new ship building yard of Messrs. Yarrow & Co., Ltd., on the Clyde, as it was naturally anticipated that a firm with progressive ideas and large experience would aim at the embodiment of the best possible practice. Great satisfaction will be experienced when it is noted that in this work the firm are to have the advantage of the skill in design and ingenuity in construction of Sir William Arrol & Co., of Glasgow. The contract for the whole of the constructional work of the new yard has been let to this company, and it is hoped that it will be possible to begin the building of vessels by the commencement of next year. It is too soon to enter into details as to this work. The general arrangement, however, has now been fixed, and the total area to be comprised within the works is 12½ acres, but the company has the right of taking an equal area of vacant land to the east of the new site. On the area acquired, which has a frontage to the river of 750 ft., with a depth of 700 ft., there is to be constructed a fitting-out basin 320 ft. long and 85 ft. wide, set at a slight angle to the flow of the river, so as to facilitate the entrance and exit of vessels, while to the east of this there will be several building berths, at the end of which the platers' shed will be constructed. To the west of the basin will be the carpenters' and pattermakers' shop and the smithy. Close to the landward boundary there will be, on the west side of the entrance to the works, the engine shop, having a total length of 210 ft., and divided into three bays, 50 ft., 65 ft., and 36 ft. wide respectively; while to the east there will be a boiler shop of 300 ft. in length, with three bays, 35 ft., 65 ft., and 50 ft. in length respectively. The offices will be located between these two shops, with the entrance, close by which the railway siding will pass. One of the new features is the construction of a gantry 500 ft. long, with columns for the accommodation of a large electric crane of 90-ft. span, so that the boilers may be taken from the shops, and the heavy loads from the engine works, right down over the fitting-out basin. This fitting-out basin will be completely covered over by a roofing, entirely glazed, carried on columns 90 ft. apart, on which the crane from the gantry already referred to will travel. In this way the loads may be conveyed direct from the boiler or engine works and deposited in any ship lying in the basin. On either side of the main roof over the basin there will be lean-to roofs, so that the workmen engaged on the wharf or aboard the vessels will be entirely free from interference owing to weather. The side roofing will be of 25-ft. span, so that the total width of roof over the basin will be 140 ft. It will thus be seen that the whole of the work will be carried on under roof, except on the building berths; but it has not yet been decided whether these shall also be covered in. Sir William Arrol & Co. have sublet the construction of the basin and the building work generally to Messrs. Morrison & Mason, of Glasgow, and will themselves carry out the whole of the constructional steel work, which will involve the use of some thousands of tons of steel.—[*Engineering.*]

## ORDERS FOR MORE BIG STEAMSHIPS.

The Pacific Coast Steamship Co. will order the construction of two new passenger steamers of the type now being built at the New York Ship Building Co.'s plant on the Atlantic coast. The three vessels as fast as they are completed will be hurried to the coast and placed on the run between Seattle and San Francisco. President H. W. Cannotn is now traveling in Europe, but as soon as he reaches New York, the formal approval of the plans for the construction of two additional steamers will be given. The order for the next boat will be given six months after the date of the contract for the construction of the vessels now building. This means that work will commence within four months. The third new steamer will be ordered a year after the contract for the first one. By the terms of the New York Ship Building Co.'s contract the vessel now building is to be constructed within twelve months. It will require an additional sixty days to deliver the boat at Seattle, or San Francisco. By the summer of 1908 it is expected all three vessels will be in the coastwise trade for it is understood that the same company will build all of them. The new vessels will be 400 ft. in length and constructed of steel. They will have passenger accommodation for 300 first class travelers, and built into each of the liners will be sumptuous suites that will rival the furnishings of the Hill liners. It is the intention of the Pacific Coast company to ultimately replace all of the vessels on the run out of Seattle with new boats and other routes will be found for the other steamers now on the run.

Capt. Omar J. Humphrey of Seattle, has purchased from the Alaska Commercial Co. the steamers Portland and Bertha, and will operate them on the Seattle-Southwestern Alaska run. Capt. Humphrey has been identified with Alaskan trade for more than twenty years.

The Kaiserin Auguste Victoria, the largest ship of the Hamburg-American line, will sail on her maiden trip May 10.

## TRANSLANTIC LINES AND STEAMSHIPS.*

BY ARTHUR J. MAGINNES, M. INST., C. E., M. I. MAR. E.

It is with no little pleasure and gratification that the author once more finds it a pleasing duty to again bring before the Liverpool Engineering Society a brief resume of the great steamship trade, which, although now no longer a monopoly of our city, is the one in which it is still paramount.

So far back as January, 1878, that is, 28 years ago, when our society was but in its early youth, this subject was brought forward under the above title, and was so appreciated, not only in Liverpool, but in the whole shipping world, that it encouraged one to become more conversant with its history to that date, and to watch and record its developments in the future.

Fourteen years afterwards, in January, 1892, the time was considered ripe for a second paper on the subject, and now in this year of grace, 1906, our worthy President, Mr. Reney Smith, and indomitable Hon. Secretary, Mr. R. C. F. Annett, are of opinion that the doings of the past decade and the unusually rapid advances of the past few years, should have a place in our Transactions.

Coming then to the subject, it is with no little feelings of pleasure and satisfaction, that notwithstanding the numerous changes which have taken place in the proprietary of the lines, due to the ambitions of other nations, and the financial jugglings of firms and financiers, it remains to be recorded that the premier and most honored line of steamships afloat today, namely, the Cunard line, is wholly British throughout all the phases of ownership.

Remembering the dread rumors which were noised abroad some few years back, as to impending changes, it will not be out of place to give a word of praise to the memory of the late Lord Inverclyde, who so courageously and patriotically held out against tempting financial proposals, which, had it not been for him, might have placed the actual control of the great Atlantic lines out of this country.

Thanks, however, to his far-seeing judgment and that of his co-directors, the Cunard line today flies both justly and proudly, the flag under which it was brought forth and developed to its present enviable position.

So far as the progress of this line is concerned, since my last paper in 1892, there remains little to record until the coming of the new century. The performances of the Campania and Lucania in the mail service are fully up to the mark, as they, together with the single screw Umbria and Etruria, today carry on a regular and satisfactory Saturday service. This is not the case with the Wednesday service, the want of a fourth fast steamer having been acutely felt for the past ten years.

With the commencement of the century, and for a year or two previously, a movement to modernize the whole fleet set in, with the result that such well-known crafts as the Servia, November 1901, Aurania, February 1905, and others, were disposed of, and new large twin-screws of moderate speed, but extensive passenger accommodation were added, the Saxonia, built on the Clyde in May 1900, Ivernia, from the Tyne in April 1900, the Carpathia brought out in 1893, also a twin-screw vessel, possessed the peculiar feature of being fitted out for third-class passengers only, this was done to develop the new departure made in 1893, of a direct line from Fiume and Adriatic ports to New York.

This service was inaugurated in consequence of the combination formed by the other lines, and gave rise to keen competition and cutting of rates, but with a result favorable to this company, although not financially.

Before commencing on the origin of the next great ship of this line, it is proposed to notice two interesting crafts which may in later years be cited as the decisive resultants in bringing about a complete departure in the propelling machinery of steamships. In stating this, however, the fact should not be lost sight of that the Allan liners Victorian and Virginian, fitted with turbine machinery, had been in existence for some months, but that two ocean liners of the newest and highest class should be built of identical hulls, but with different machinery in order to test the relative merits of the latter, is unique, and of inestimable value to the shipping world at large.

Similar pairs of vessels on smaller scale had previously been built to test the merits in the Channel trades around the United Kingdom, but to test this by building two such costly crafts as the Caronia and Carmania, is a feat worthy of the Cunard Line.

Both of these vessels were built by Messrs. John Brown & Co., the successors of J. & G. Thomson, the builders of many early Cunarders, at Clydebank on the Clyde, in the past year, 1905. The dimensions of each are:—Caronia, 672.5 and 650 by 72 by 52; displacement = 31,000; Carmania, 672.5 and 650 by 72 by 52; displacement = 31,000; and so far as possible they are identical.

For the machinery, however, two entirely different designs have been adopted, that for the Caronia being twin-screw quadruple-expansion reciprocating engine, and for the Carmania triple-screw Parsons turbine.

The former vessel sailed on her first voyage in February, 1905, and the latter on December 3 of the same year, since when the excellent performances of the latter vessel have proved that for the North Atlantic high-speed passenger service, the turbine form of propulsion is the more suitable.

The next feature to be considered when dealing with the Cunard Line, is the one to which brief reference has already been made, that is the completion in September 1902 of an important agreement with the British government, which was received with universal satisfaction throughout the country, and commended in every way. The whole maritime feeling was suddenly aroused, and the attention of the governing powers called to the necessity of some authoritative action being taken by the company at large to prevent the control of the great steamship lines of the country from passing into the hands of other nations.

This change was brought about by the operations of a wealthy syndicate formed abroad for the purchase of various British lines of steamers, en bloc, and so gaining control of the whole organizations, not only for commercial, but also, if required, for naval purposes. Once this was accomplished, but little further steps would be necessary to quickly change the registered nationality and flag of the vessels if circumstances so required it.

This, however, was not a state of things to be permitted, as it was felt that if the financial wants of too ambitious and grasping ship builders and needy steamship owners were to be placed before the higher considerations of patriotism, some steps must be taken to prevent money buying that which all efforts at legitimate trading had been utterly unable to effect in the past, namely, wresting from the British flag the ocean-carry trade of the world and maintaining the supremacy of the seas.

Profiting by the lesson, and recognizing that the day had gone by when it was possible for any private company or ownership to build and maintain the fastest Atlantic liners afloat which would be dividend-paying, the Government entered into an agreement with the Cunard, by which they would obtain financial aid, not only for carrying mail purposes, but also to enable them to build the largest, fastest, and finest vessels afloat. Previous to this arrangement being made, the British lines had practically abandoned the building of high-speed vessels, as it was found that the large, slower type of vessels, fitted with but moderate engine power,

*Read before the Liverpool Engineering Society.

but extra large passenger accommodation, were much more profitable.

The terms of this agreement were tersely as follows:—

The Cunard Line to build, at once, two large steamers, and the whole undertaking to remain purely British, both in the management of the line and the holding of its shares, all the vessels, present and future of the fleet to be at the disposal of the Government, and have all officers and engineers in charge of a watch, and at least three-fourths of the crew British subjects, with preference to naval reserve men.

No undue advance to be made in the freights or passenger rates, nor favoritism shown to outsiders. The financial arrangements were to obtain an immediate advance of the amount required to build the two vessels, estimated to be £2,600,000, at 2¾ per cent, to be repaid in a period extending over twenty years.

A further arrangement was made to pay the line an annual sum of £150,000 per annum, when the two largest vessels were at work.

Soon after the ratification of this wise and far-reaching agreement, orders were placed, one on the Clyde, with John Brown & Co., of Clydebank, and the other on the Tyne, with Swan & Hunter, of Wallsend, for the construction of the two most remarkable high-speed steamers which have ever been designed, for not only will they be the longest, broadest, and deepest crafts ever constructed, but they will be the first merchantmen fitted with four propellers.

Judging by the designs, these twin vessels will be very commanding-looking, having two polemasts, and four huge funnels, and hulls rising with the deck erections to a considerable height above the water. In order to form an idea of the dimensions, it is only necessary to give those of the largest vessels belonging to the line at the periods when the last papers were read, namely, in 1878 and 1892.

| | Length Feet | Breadth | Depth | Displacement. | I.H.P. | Consumption per day | Speed Knots |
|---|---|---|---|---|---|---|---|
| Bothnia, - 1878 | 455-425 | 4.25 | 35 | 6,080 | 2,950 | 65 | 13 |
| Campania, 1892 | 620-598 | 65 | 43 | 21,000 | 30,000 | 500 | 22 |
| New - 1905 | 785-760 | 88 | 60.5 | 41,500 | 65,000 | 850 | 25 |

When these figures are compared with one another, and it is remembered that the dimensions of that old veteran which has passed away, the Great Eastern are in every particular very much less, some idea may be formed of the magnitude of the Atlantic liners in the twentieth century.

The designs of the hulls present no remarkable features excepting in the arrangements about the stern, where, owing to the adoption of the four propellers, it has been necessary to make room for the outward pair some distance—about 40 feet—forward of the after pair, which are placed as in the ordinary twin-screws, not overlapping. Notwithstanding the forward position of the outside propellers, it has been found possible to keep them well inside the beam of the ship, owing to the fineness of the lines aft. To aid the steering qualities and avoid useless constructional weight, the after portion of the hull is arched upwards for about 30 feet, and falls gracefully down to the heel of the rudder post, where it gives ample strength for the immense steering strains which have to be provided for when running at high speed.

Concerning the passenger accommodation, this is intended to be somewhat after the arrangements which have been so satisfactory on the Caronia and Carmania, but enlarged and improved as the larger structure will permit, with the result that the number of passengers and crew will far exceed that of any other craft afloat.

With reference to the machinery, although the merits of this will be considered later, it will not be out of place to here give a few particulars. The design adopted is that of the Parsons turbine, working through four shafts and four propellers and as it is hoped to get equal to 60,000 indicated horsepower, that is 15,000 out of each engine, a slight idea of the magnitude of the machinery installation can be formed. The total length of the space occupied by the machinery and boilers, also bunkers for over 6,000 tons of coal, will exceed 480 feet, representing space for about 28,000 tons of cargo.

Then, as regards weight to be carried, this, with water in boilers, will not be less than 11,000 tons, which is greater than the whole displacement weight of the vessels employed some years ago.

In leaving this brief retrospect of the Cunard Line it only remains to be stated that it still possesses the proud boast, that not a single passenger's life has been lost throughout its long career of over 60 years, by shipwreck or collision, nor by any other cause, until the unfortunate shipping of a tidal wave by the Campania a month or two ago, when a few lives were lost by being washed overboard or hurled about the decks.

The next important line to come under notice is one which also resisted the temptations of capitalists and still remains British throughout, namely, the well-known Allan Line, formerly trading to Canada alone, but now following the progress of the age, having vessels trading east and west and north and south, but still maintaining as its leading branch the great trade to Canada.

This important service has, thanks to the progressive and spirited policy of the owners, recently brought out some large and powerful vessels of moderate speed, such as the Bavarian and Tunisian, and more recently, in 1905, once more became pioneers, as in the introduction of steel vessels in 1879, by having the pluck and foresight to build and send forth the first large turbine-propelled ocean steamer in the Victorian, which was built by Workman, Clark & Co., at Belfast, and sailed on her first voyage from Liverpool for Halifax on March 23, 1905, and the Virginian, built by Stephens at Glasgow.

These two vessels being, so to speak, epoch makers, it will be well to put on record their dimensions, although not of the high-speed required on the Liverpool-New York service.

| | Length Feet | Breadth | Depth | Displacement. | I.H.P. | Consumption per day | Speed Knots |
|---|---|---|---|---|---|---|---|
| Victorian - 1905 | 520 | 60.4 | 38 | 17,850 | 13,000 | 220 | 17 |
| Virginian - 1905 | 520 | 60.3 | 38 | 17,850 | 14,000 | 230 | 18 |

Both these vessels jumped into popularity at once, so to speak, and with the exception of a mishap to the Victorian by grounding in the St. Lawrence in autumn of 1905, have continued to do good service. It is now rumored that the results have been such as to induce the line to build two more vessels with the turbine machinery.

Before passing on to other lines it only remains to be stated of the Allan Line that it had the honor of being the steamship line which remained the longest under private ownership, the first change in such, from its inception in 1854, only taking place in 1897, when it was registered as a limited company.

Following after the Allan, the next line to come to the front was the well-known Anchor Line, sailing between Glasgow and New York, but like most of the other prosperous lines now having vessels engaged in other trades throughout the globe. This line, although trading for many years, has always refrained from putting on high-speed steamers, the only one of note being the beautiful City of Rome, which came to an end in October 1902, when she was sold and broken up in a German port. Recently, in 1904 and 1905, two fine vessels fitted with twin screws, named the Columbia and Caledonia, have been added to the New York service.

Taking the lines in chronological order, the next to be noticed is the once well-known, but now moribund, National, which gradually dwindling away as an independent concern fell under control of a London firm—American owned but British registered—which keeps it just alive with two steamers.

The other once-noted line, the Guion, with its well-known red-capped funnels, came to an end in April 1894, when the noted greyhound, Alaska, sailed for the last time.

The next line to claim attention, is the one which has had the most eventful, and so far as Great Britain is today concerned, the most disappointing career of all the efforts to "bridge the Atlantic," namely, the White Star. The story of this now extensive line is one which would appeal to the pen of some great author, who could recount—as briefly noted by me in 1878—its brilliant forthcoming in 1871, then its sudden set-back by the disastrous loss of the Atlantic in 1873, followed by its uphill struggle through the depressed periods of 1877, 1878 and 1879 when this line and the older Inman were reduced to only sailing a steamer each alternate week, then its gradual coming to the front again in the early eighties, when it first carried the British mails under contract.

Then, during the same decade (the eighties), still advancing with its first wondrous and uniform fleet, which continued to serve them in good stead down to 1889 when spurred by the then Inman and International Line, an American concern, British managed—they brought forth the Teutonic and Majestic, which were practically the last efforts made by them to maintain the fastest vessels on the Atlantic.

Particulars of these vessels need not now be noted as they were fully set forth in my last paper in 1892, but the next step taken ten years later, in 1899, was to bring forth a second Oceanic, a vessel the very antithesis of the first one, for when the former came forth, in 1871, the whole of the vessel and machinery represented a bold departure from all previous practice and also a clipper in speed, whereas the latter presented no advanced features whatever (not even wireless telegraphy, then just coming into use), and was also in speed much behind the noted Cunard and German lines of that date. The only feature of unusual interest, was the fact that she was the first vessel to exceed in length the Great Eastern, built 42 years previously.

The coincidence of this, so to speak, "rest on its oars" of this line when about 30 years established is remarkable in the fact that the same course was followed by the Cunard when passing through the same age or period of its history.

Since the coming of the second Oceanic, other slower but huge vessels with large passenger accommodation, named Celtic, Cedric and Baltic, have been added to the fleet, and another to be named the Adriatic is now under construction, but beyond the fact of their huge size they present no features calling for special notice, excepting the avoidance of any novel innovation. Should this system of only putting slow-speed vessels on the Liverpool, Queenstown, and New York service be continued, it will soon be unnecessary for the Government to subsidize a Wednesday mail service, for when the two coming Cunarders are on the station next year, and the Lucania and Campania are kept at full speed, the arrival at New York of the boats leaving Liverpool on Saturdays will be either in advance or alongside of those sailing on the previous Wednesday.

Although not actually originating with this line, it will not be out of place to here notice the great combination which a few years ago purchased the whole concern, and to the surprise and disappointment of the British marine world, so transferred the actual ownership and management to the United States, although by agreement with the British Government allowing the vessels to remain under the British flag, and nominally controlled on this side of the Atlantic. This extensive organization, officially known as the International Mercantile Marine Company, had but a small beginning about the year 1880, when some American capitalists, who were largely interested in the Red Star Line from Antwerp to New York, were induced to rehabilitate the original American Line then trading between Philadelphia and Liverpool, which they did, and in 1884, this line became part of the organization known as the International Navigation Company of New Jersey. In 1886 this concern purchased the Inman Line of Liverpool, and changed the title to the Inman and International, then, in 1893, this was again changed to the American Line, and in 1900 the Leyland Line of Liverpool and Boston steamers and the Atlantic Transport Line—an American organization—trading from London and Bristol Channel ports, were absorbed into the undertaking. Following after this the Dominion Line was taken over, and other lines trading from London. As the absorption and consolidation of these lines were going on, rumors as to the purchase of the White Star Line were prevalent, but officially denied up to the date—September 1902, when the purchase was actually completed and further denial was useless; and it is remarkable that the Americans should once more become proprietors of the line whose vessels bore names with the same terminals as their once well-known Collins Line.

This powerful organization having been completed, and working arrangements made with the Continental lines, efforts were then made to coerce the Cunard Line into the organization, and to induce the other lines to join, but as already noted, thanks to the late Lord Inverclyde and the prompt action of the British Government, this was not carried out.

Following on the formation of the Combine, as it is now tersely styled, far-reaching changes took place, mainly with a view of economizing and consolidating the working of the lines so as to prevent competition with one another.

The new passenger vessels of the Dominion Line were re-named so as to become part of the White Star fleet, and the original American Line from Liverpool to Philadelphia revivified by placing large modern steamers on that service, whilst the Leyland Line has been developed into an extensive cattle and freight service.

As was only to be expected, the formation of this great organization caused changes in the management, with the result that the original partnership of the well-known firm of Ismay, Imrie & Co. was dissolved in December 1902, and at the same date the original European agents and managers (Richardson, Spence & Co.) ceased to exist.

Many of the older steamers have been sold to be broken up and as many of those still existing are rapidly becoming antiquated, they will, no doubt, soon be disposed of also, and then, so far as the leading lines are concerned, only large modern boats will be engaged in the Liverpool services, but it is to be hoped that some steps will be taken by the managers to place at least one more 20-knot boat on the Wednesday Royal Mail service, for, as already noted, this service has for the last ten years been always unsatisfactory on one Wednesday in four, and it is not likely that the requirements of the Royal Mail service can be properly carried out by 17-knot steamers, no matter how large they may be or how elaborately fitted for passengers.

Considering that the concern owns steamers fast enough to keep pace with three Liverpool liners, Teutonic, Majestic, and Oceanic, it seems but a poor way of fulfilling a contract, and it is to be hoped that the powers which be will at an early date insist upon the undertaking being properly carried out, either by the immediate construction of a new high-powered steamer or the substitution of one of the fast Southampton Line boats.

It seems here almost necessary to apologize for enlarging

upon these requirements before a scientific society such as ours, but at the same time it may indirectly bring about still further advances in our own profession, for it may be just possible that such a state of things being noticed here may arouse or awaken fresh enthusiasm in the minds of those who once strove by every effort to keep in the forefront, and so induce them to look further ahead than mere dividends and produce another advance in naval architecture and marine engineering even on the new turbine system itself.

Returning to the lines, it is only necessary to briefly notice the Southampton-New York service of the Combine, which has carried on with the same four steamers for the past ten years, and as no newer or faster crafts are either being built or projected, it is evident that no great expansion of this service is taking place.

Among the independent lines still plying to and fro, it remains to briefly mention the Warren, Johnston, Wilson, Manchester, Bristol, which are carrying on extensive freight services with large modern steamers of ordinary design of hull and machinery, and we then come to the vigorous young Canadian Pacific Line, or, as it is generally called, the C. P. R.

This fast-extending and favorite passenger line came into existence but three years ago, in April 1903, and was suddenly created by the purchase from Elder, Dempster & Co., of the whole of the service of the Beaver Line between Liverpool, London, Bristol, and Canadian ports, by the Canadian-Pacific Railway Company. so that they could have their own vessels on the Atlantic as well as on the Pacific, and since they commenced operations, a regular and well-appointed service has been carried out between the above ports, which will be still further improved by the addition of fine new twin-screw passenger vessels of 18-knot speed from the Fairfield yard on the Clyde, early this year, these vessels, following the style of those on the Pacific, are to bear the names "Empress," being the Empress of Ireland and Empress of Britain, their dimensions are 569 feet by 65.5 feet by 40 feet, 14,500 tons gross, and 20,000 displacement, and they are fitted with ordinary reciprocating twin-screw four-crank quadruple machinery to indicate up to about 18,000 horsepower.

The hull and machinery of the vessels call for no comment, as they present no special features of interest.

Turning now to the countries outside of Great Britain, it will be only necessary to mention the more important, such as the Rotterdam-American from Holland, the Red Star from Belgium, already noted as portion of the Combine, the Compagnie Transatlantique from France, the Compania Transatlantica from Spain, Rubattino from Italy, and Bensaude from Portugal, and we come to the two great German lines, the Hamburg-American from Hamburg, and the Nord Deutscher from Bremen.

The wonderful progress of these two latter concerns manifested in the splendid steamers which they have sent forth calls for more than passing notice, for after following for many years in the wake of the leading British lines, the Nord Deutscher, in 1896, placed an order with the Vulcan Company of Stettin for a steamer to excel the Cunard Campania and Lucania, which was to be the largest and most powerful liner yet constructed. This vessel, the noted Kaiser Wilhelm der Grosse, soon became famous, as she exceeded the Cunard vessels both in size, power and speed. Spurred by the doings of this the first twin-screw owned by the line, the competing Hamburg-American Line made another advance and brought forth, in 1899, a powerful vessel named the Deutschland, also built by the Stettin company, but of slightly larger hull dimensions, and considerably more power of machinery. Following upon this vessel came the Kaiser Wilhelm II, for the Nord Deutscher Line in 1903, which up to now is the most powerful steamer ever built, and likely to represent the acme of the reciprocating machinery, which has so long been recognized as the only reliable propelling power.

Since these powerful vessels commenced plying on the Atlantic they have surpassed all records in speed, and up to the present hold the coveted honor of the fastest passages, which it is to be hoped will be regained by the coming turbine Cunarders early in 1907.

In order to readily form some idea of the continued advance in every particular of the Atlantic liner, I have pleasure in giving a table of dimensions of the newer vessels, which to those interested will well repay careful perusal.

When considering the particulars it is interesting to note that the best day's run yet effected on the westward passage was that made by the Kaiser Wilhelm II., which ran a distance of 564 knots in a day. On the homeward or eastward passage the best run was made by the same vessel, when the distance was 583 knots—these results point to an average speed of 23½ and 24¼ knots per hour, which, if steadily maintained all across the Atlantic means just over and just under 5 days' passage from Queenstown to Sandy Hook, or vice versa.

Although one is met by the well-known adage, "It is never safe to prophesy unless you know," it is tempting when going over these figures to form an estimate as to the speeds which may be attained in the near future by the new Cunarders, especially when it is borne in mind that the Carmania, Victorian, and Virginian, as turbines, have satisfactorily come through their trials both on the measured mile and in the regular service.

The indicated horsepower designed for—so far as boiler power is concerned—is reported to be 50,000 to 60,000, and as this is some 50 per cent more than the Kaiser Wilhelm II., it is not unreasonable to expect that the average speed will be in the neighborhood of 25 knots per hour, so that the distance traversed in one day may reach 600 knots, which gives a passage of about 4 days 12 hours from Queenstown to Sandy Hook.

As these performances will more than likely be carried out and will be in themselves remarkable, it will be seen on a little consideration how heavy is the penalty of continuous high speed at sea.

When the first paper was read, in 1878, the fastest passages were made by vessels:—

| | Ft. long | Breadth | Deep | Displacement | I.H.P. | Speed | Cost |
|---|---|---|---|---|---|---|---|
| | 455 | 45.2 | 33.7 | 9,000 tons | 5,100 | 16 knots | £200,000 |
| 14 years later, in 1892, these figures were advanced by twin screw steamers to | 566 | 57.8 | 39.2 | 16,740 " | 18,000 | 20 " | £460,000 |
| Again in 1899, to .. | 666 | 65.5 | 45.5 | 24,400 " | 38 000 | 23¼ " | £740,000 |
| Whereas the coming Cunarders will through adoption of turbines and 4 propellers increase these to | 760 | 88 | 60.5 | 41,500 " | 60,000 | 25 " | £1,250,000 |

So that to increase the speed from 16 knots to 20 required an increase of I. H. P. by 4, of displacement by 1¾, and of cost by over 2, which meant a saving of time on the passage of 1 day 19 hours; from 16 knots to 23¼ required increase of power by 5, of displacement by 2½, and of cost by 3¾, saving on passage being 2 days 4 hours; and from 16 knots to 25 required increase of power by 12, of displacement by 4½, and of cost by 6, saving on passage being 2 days 23 hours.

These figures briefly resolve themselves into the fact that in order to gain 3 days on the passage from Queenstown to New York, it is necessary to increase the size and horsepower of the vessels to such an extent that the first cost is

£1,250,000, and in addition £30,000 per month to cover insurance, maintenance, depreciation, and other charges. These particulars fully explain why the fastest Atlantic greyhound has ceased to be a dividend earner, and why the huge moderate-speed passenger liner now prevails.

Turning now to the more technical side of these liners, it is somewhat difficult to find any novelty specially calling for attention outside the great coming change which will take place through the application of the turbine principle.

During the years past since 1892 no radical changes in any portions of the machinery or boilers took place, so that all that was effected was merely to increase the size and number of the working parts and of the boilers, until at last the latest and most powerful machinery of the reciprocating type developed into enormous masses with no less than 16 cylinders and 12 crank shafts, and 19 boilers of the Scotch type, with 124 furnaces, which bring about a consumption of 660 tons of coal per 24 hours.

One thing which is remarkable about the boilers is the total absence of any attempt to use the water-tube boiler by any of the countries building ocean liners, as so far none is fitted with them, and the same may be said of all the high-speed passenger vessels for channel or river service.

Notwithstanding the large number of working parts and connections entailed both in the machinery and boilers, it is pleasant to record that breakdowns have become less and less, and an overdue express liner is now almost an unheard of event. It is also gratifying to be able to state that up to date none of the modern twin-screw liners of any nation has been either wrecked or lost by collision.

Although little of novelty is now left to relate of the modern marine engine, it will not be out of place before concluding to give the results as produced by the consumption of one pound of coal which I gave for the various classes of vessels in my presidential address of ten years ago.

In that I then pointed out that the express passenger steamers represented for the consumption of one pound of coal—

| | | | | | |
|---|---|---|---|---|---|
| 1881 | .57 | displacement tons of which the hull absorbs | } | 32% machinery, and fuel 40%, leaving an earning weight of .16 tons, | |
| 1895 | .45 | " | " | 33% " 47% | .09 " |
| 1899 | .42 | " | " | 40% " 50% | .044 " |
| 1907say | .52 | " | " | 42% " 45% | .06 " |

It must, however, be noted that this does not take into consideration the great increase of speed, and it must be borne in mind that cargo is not earning power on a fast liner, but mails and passengers.

Turning now to the general aspect of this ever-expanding trade, a wide field presents itself for consideration as to its future. One stands aghast at what will become of the figures which will have to be dealt with after the lapse of another 28 years, should the same rate of progress be sustained, or even if only advanced by slower steps. Had one been so venturesome in 1878 as to announce that the enormous vessels, as they were then considered to be, would be increased in size, speed, and cost to those existing today, he would have been looked upon in the light of a visionary of the very first water, and yet the rate of advancement in every class of traffic, mails, passengers, and freights, is now more rapid than ever.

Added to this, the policy of nations now comes into the field, with the result that future advances as to speed are not likely to be hampered by the question of earning efficiency to the same extent as of yore, for the reason that the requirements of a great maritime nation as our own has become such as to render it imperative that state aid at a moderate charge to the owners must be freely given to insure that the fastest ocean-going craft afloat remain at their ready command.

Assuming this to be the case, and that advancement will go on, our descendants, perhaps in this very room, will assemble to hear of the doings of (let us hope) still Cunarders, measuring, say 1,500 feet in length, 175 feet beam, and indicating about 100,000 horsepower, but how applied I am unable to forecast, so that it only remains to thank you for the patient hearing you have given me.

PARTICULARS OF ATLANTIC LINERS.

| | Lucania | Oceanic | Baltic | Kaiser Wilhelm II. | N Cunarders |
|---|---|---|---|---|---|
| Displacement | 20,000 | 26, 00 | 33,000 | 26,000 | 41,500 |
| Draught .. | 30 | 30 | 30 | 30 | 32 |
| Speed .. | 22 | 20 | 16½ | 23.5 | 25 |
| I.H.P. .. | 30,000 | 29, 00 | 16,000 | 33/40,000 | 60,000 |
| Pressure .. | 165 | 92 | 210 | 225 | 195 |
| Consumption | 485 | 4 00 | 260 | 660 | 840 |
| Length—Overall | 620 | 704 | 725 | 706.5 | 785 |
| P.B. | 598 | 685.7 | 700 | 684.3 | 760 |
| Breadth .. | 65 | 68.3 | 75.6 | 72.3 | 88 |
| Depth .. | 43 | 49 | 49 | 52.6 | 60.5 |
| Gross Tonnage | 12,950 | 17,274 | 23,800 | 19,360 | 28,830 |
| H.P. Cylinders | 4 of 37 | 2 of 47½ | 2 of 33 | 4 of 37.4 | |
| I.P. do. | 2 of 79 | 2 of 79 | 2 of 47½ | 4 of 49.2 | 4 |
| Second I.P. | — | — | 2 of 68½ | 4 of 74.8 | |
| Do. L.P. | 4 of 98 | 4 of 93 | 2 of 98 | 4 of 112.2 | Turbines |
| Stroke .. | 5.75 | 6 feet | 5.25 | 5.8 feet | |
| No. of Boilers | 13 | 16 | 8 | 12 double 7 single | 24 |
| Do. Furnaces | 102 | 96 | 48 | 124 | 192 |
| Grate area | 2200 | 2183 | 1,014 | 3,121 | 8,954 |
| Heating surface | 82,000 N.D. | 74,000 A. D. | 41,880 | 107,643 N.D. | 160,000 |
| Total cost . | £615,000 | £739,000 | £800000 | £927,200 | £1,250,000 |

## BRITISH AND FOREIGN SHIPS ON SAME FOOTING.

The long promised bill amending the merchant's shipping act so as to place British and foreign ships on the same footing was introduced in the house of commons last week by David Lloyd-George, president of the board of trade. The bill, which undoubtedly will pass, makes the British regulations concerning the overloading, undermanning and unseaworthiness of vessels, the storage of grain on board ships, the furnishing of adequate life saving apparatus and the control of emigration and passenger traffic which heretofore have only applied to British ships, applicable to all foreign vessels using British ports.

Commenting on the measure, Mr. Lloyd-George referred to the demands for the exclusion of foreign seamen from British ships and said he found that in 1904 there were 39,000 foreigners so employed, against 176,000 British subjects. He feared that the exclusion of foreigners would ruin the mercantile marine, but under the new bill foreigners hereafter must know sufficient English to understand words of command.

Continuing Mr. Lloyd-George explained that the government only proposed to impose on foreign ships the obligations imposed on British vessels for years and where the government was satisfied that the regulations of any particular country were substantially equal to the British regulations the ships of that country would be exempt as a whole from the British rules in regard to loading.

## STRANDING OF THE OLYMPIAN.

On March 13 the steamer Olympian dragged her anchor and went ashore in Possession bay, Straits of Magellan, and the getting of the stranded vessel afloat again will prove a very difficult undertaking. The latest advices from Runta Arenas, in the Straits of Magellan report that a contract has been awarded to local salvors to float the Olympian. The vessel is to be floated for $17,500, and if the task cannot be accomplished, the salvors are to receive nothing. Recently the Olympian left San Francisco in tow of the steamship Zealandia, bound for New York. Both the steamer and the tow had made excellent progress up to the time that the Olympian went ashore.

Hind, Rolph & Co., San Francisco, are to construct two steamers in the near future for the San Francisco and Nome trade.

inst. the [illegible] 928 tons of grain and flax seed. Is there not some [illegible] in this? Buffalo alone received last year 3,256,018 net tons of grain and flax seed, nearly all of which, except possibly about 40,000 or 50,000 tons from Toledo passed down Detroit river. In addition to this, a large amount from the upper lakes, went to Erie, Fairport, Toledo, Sandusky, Cleveland and the Welland canal. I have not the figures for any of these, but they must add largely to your Detroit river data.

Buffalo had

| | | | | |
|---|---|---|---|---|
| 40,453,000 | bu. | wheat | 1,213,590 | net tons |
| 32,753,000 | " | corn | 917,084 | " " |
| 25,734,000 | " | oats | 411,744 | " " |
| 689,000 | " | rye | 19,292 | " " |
| 14,625,000 | " | barley | 351,000 | " " |
| 12,261,000 | " | flaxseed | 343,308 | " " |
| | | A total of | 3,256,017 | " " |

Buffalo, March 23. JUNIUS S. SMITH,
Lake Weighmaster, Chamber of Commerce.

---

The figures to which Mr. Smith takes such deserved exception are those compiled by the bureau of statistics of the department of commerce and labor as taken from the reports filed by the various collectors of customs. These reports are unfortunately fragmentary and do little more than approximate the commerce of the lakes. There is no congressional authority for the collection of port to port statistics which is the reason that all attempts at collecting the figures are unsatisfactory. Mr. Smith very clearly shows how greatly the grain figures, as given in the government

## ADVOCATING A 19,400-TON BATTLESHIP.

Secretary Bonaparte appeared before house committee on naval affairs last week in support of an increase of the navy. He advocated an appropriation this year for two 16,000-ton battleships, and in case congress does not see fit to provide for two such ships he urged the construction of one 19,400-ton battleship. In this recommendation he surpassed Admiral Dewey, who surprised the committee by advocating 18,000-ton battleships after the type of the English battleship Dreadnought.

In the main, Secretary Bonaparte's recommendations were in harmony with those included in his annual report. Two scout cruisers were recommended in the report, but he said to the committee that these were not indispensable. He advocated the building of four destroyers at a cost of $3,000,000; two submarines costing $500,000; one gunboat costing $600,000; and two river gunboats at a cost of $200,000.

The secretary's estimates for construction aggregate $23,300,000. Of this sum the chief item is $15,000,000 for the two battleships recommended. The cost of the two proposed scout ships which Secretary Bonaparte said were not indispensable is estimated at $4,000,000. Secretary Bonaparte advocated the 19,400-ton battleship because he said American constructors felt this tonnage was necessary to carry ten 12-in. guns such as the Dreadnought is carrying.

---

The Wm. Skinner Ship Building & Dry Dock Co. has purchased the plant of the Baltimore Ship Building & Dry Dock Co. for $287,500.

In its next issue the MARINE REVIEW will begin its series of articles upon scientific lake navigation under the general supervision of Mr. Clarence E. Long, of Sturgeon Bay, Wis. Lake masters know what to expect from this service. All books of navigation hitherto written have been general in their nature. Lake mariners in order to extract from them information of importance to themselves were required to absorb a great deal that was of no special benefit. Mr. Long's correspondence will be devoted entirely to the lakes and will be confined to those problems which confront the lake masters every day. Mr. Long is not a college man, but has developed himself through his own efforts. He says very truly that whatever he has been able to acquire any master on the lakes will be likewise able. His instruction is to be published in the simplest language and no master need be afraid to ask any question that he desires answered. Through his question and answer department Mr. Long will amplify the excellent series of articles which he has already published in his nautical magazine. As there is certain to be a demand for back copies of the REVIEW containing Mr. Long's articles, the precaution will be taken to publish several hundred extras of each issue. The subject is

[redacted] to the house for action. Certain political complications, having nothing whatever to do with shipping but having a great deal to do with railroad rates, have had the effect of taking up consideration of the shipping bill. There is every reason to believe now, however, that the bill will be given fair play. Certainly at no time in the history of the country has the temper of the people been so thoroughly aroused on the subject of shipping. This has been due to the generous education that the people received on the subject. The middle-west, which hitherto was always regarded as hostile to any government aid to shipping, now recognizes its necessity.

Recently *The Scientific American* published a brief editorial on the subject of "The Good of Ship Subsidies," which is about as sensible a little thing as we have seen in a long time. *The Scientific American* says:

"Judged from the commercial standpoint, the question of ship subsidies is purely one of expediency. None of us are particularly fond of the term subsidy, and some of us have tried to get away from it by a bit of psychological legerdemain which ends in calling it subvention. Be that as it may, however, subsidizing is but a matter of giving heroic treatment to a

patient whose case is desperate. There can be little doubt that if the bill is passed and becomes a law, the next ten years will see a notable revival of an art for which this country has proved itself in the past to have splendid aptitude. When once our merchant marine has become big enough to carry the whole of our deep-sea trade, we shall not only have diverted vast annual revenues back to their legitimate channel, but we shall have developed a magnificent industry, given employment to a large army of skilled labor, and caused the American flag to fly once more in a score of seas and at a hundred ports where now it is conspicuous by its absence."

There is no doubt whatever but that the passage of the shipping bill will result in a great stimulus of the shipping industry. Probably within a year after its passage the ship yards of the United States will be building 100 vessels for the foreign trade. Every ship builder in the United States will doubtless profit by these contracts, because a certain percentage of the ships would be built on the great lakes. Nothing could be done that would add more to general prosperity than this, because it would quicken every industry in the land.

## LAKE CARRIERS AND LABOR.

The executive committee of the Lake Carriers' Association has been in session during the present week at Detroit with the delegates of the Lake Seamen's Union and the Marine Cooks and Stewards. The Lake Seamen's Union at first declined to consider the schedule of wages until recognition for the lake pilots was secured. The Lake Carriers' would not listen to this proposition and the conference was abruptly terminated, but was resumed again the same day when the lake seamen withdrew their demand for recognition of the mates. After that there was little difficulty in reaching an agreement which, while it does not differ in essentials from the agreement that obtained last year, is nevertheless in minor particulars of more advantage to the seamen. A concession of 25 cents an hour for all over-time was allowed, ten hours to constitute a working day in port. A wheel-house must also be installed on every barge on the lakes by Sept. 15 to provide shelter from the elements.

The first thing the marine cooks and stewards did at their conference was to ask for an increase of $20 a month. This was refused, but the cooks on first-class steamers secured an advance of $10 a month. A waiter will be carried on all boats having two dining rooms or having a passenger dining room. This means a flat rate of $30 a month for cooks on large steamers. The cooks on smaller steamers will be paid $70 a month. Second cooks and waiters will get $30 a month until Oct. 1, and $37.50 after Oct. 1. Barge cooks will receive $45 a month until Oct. 1 and $65 a month thereafter. Mr. Harry Coulby, president and general manager of the Pittsburg Steamship Co., announced that all barge cooks who will remain with him for the full season will be given $5 a month additional. The executive committee will now deal with the marine engineers.

The Merrill-Stevens Co., Jacksonville, Fla., launched a floating dry dock with a lifting capacity of 4,200 tons recently. This is the largest commercial dock south of Newport News.

## FREIGHT SITUATION.

The ore shippers that were calculating on an opening of navigation by April 1, have had to amend their plans and certain of them came into the market this week for additional tonnage. A few blocks of ore were covered at the contract rate of 75 cents. The Steel Corporation says that it has not chartered any ore since the first of the year, and has no announcements to make along that line. While the weather has moderated considerably during the past few days, vessel owners are not expecting navigation to open before April 20. It was April 28 before the vessels that attempted to open navigation last year were released from White Fish bay. No attempt will be made to push vessels until everything is favorable for safe navigation. It may be that navigation will not open this year any earlier than the actual opening last year. In that event the large shippers are likely to charter considerable more tonnage between now and that time. A number of the independents would be willing to have more contract ore, though it is probably true that the wild movement this year will be largely in excess of that of last year. The average rate at which all ore was moved last year is now being compiled by the MARINE REVIEW. It will be found to vary so little from 75 cents, that it might as well be called 75 cents. The wild rate doubtless will open at that figure this year.

No wild coal charters are reported, but practically every ship that leaves Lake Erie ports on its first trip will take a cargo of coal to the head of the lakes at 30 cents, and to Milwaukee for 40 cents.

## TWO MICHIGAN LINES CONSOLIDATED.

The Chicago & South Haven line has been incorporated with a capital stock of $2,500,000 to take over the property of the Michigan Transportation Co. and the Dunkley-Williams Co., the two lines which for several years past have been handling the excursion and freight business between Chicago and South Haven. The properties absorbed include not only the dock leases, but the steamship Eastland, of the Michigan Transportation Co. and the City of South Haven, Iroquois, City of Kalamazoo, Williams, Petoskey and Glenn, of the Dunkley-Williams line. The new company will reach out to other towns, such as Saugatuck and Douglass, which have become summer resorts in recent years. Mr. George T. Arnold, of the Arnold line of steamers has been elected general manager of the company and W. H. Cochrane, general superintendent and traffic manager.

## FLOATING DRY DOCK LAUNCHED.

The Merrill-Stevens Co., Jacksonville, Fla., recently launched a wooden floating dry dock capable of accommodating any vessel that uses the St. John's river. The new dock is 260 ft. long, 85 ft. wide and 35 ft. high. The Merrill-Stevens Co. is now well equipped for ship building and ship repair. The company was established in 1887, but at that time was practically little more than a blacksmith and boiler shop. The company soon, however, began the construction and repair of vessels, and in 1896 bought the Jacksonville Marine Railway Co.'s two ship yards and marine railways. The company has, during recent years, constructed quite a number of creditable steamers. The officers of the Merrill-Stevens Co. are: A. D. Stevens, president; A. R. Merrill, vice president; F. Seeley, secretary and J. E. Merrill, treasurer.

The Wisconsin Central Railway Co. has sold its coal and commercial freight dock at Ashland, Wis., to the Central Dock Co., a new organization. Mr. F. O. Tarbox, formerly division superintendent of the Northwestern railway, will manage the new dock.

## SHIPPING BILL INDORSED.

The committee on national affairs of the republican club of the city of New York upon the merchant marine shipping bill made the following report which was unanimously adopted by the club at its monthly meeting March 19, 1906: To the members of the republican club:

Your committee on national affairs, having had under careful consideration the subject of our shipping in the foreign trade, its consideration and needs, together with the bill now pending in the congress of the United States (S. 529) the purpose of which is to remedy such condition and meet such needs, recommends that the club approve of said bill, and that it acquaint the members of the house of representatives with these reasons, which follow, in support of such approval, in the hope that these reasons may commend themselves to the house of representatives, to the end that, at the present session, the measure which has already passed the United States senate, may receive the approval of the house and the president.

In 1861 our shipping in the foreign trade was the greatest in the country's history. It aggregated 2,496,894 tons. For the fiscal year which closed on June 30, 1905, our registered oversea shipping aggregated 943,750 tons. This shows that our shipping in the foreign trade today is but a trifle more than one-third what it was in 1861. At the latter date our deep-sea shipping carried 65 per cent of our foreign commerce; last year it carried but 12 per cent. Our shipping has not declined for the lack of commerce, as the value of our imports and exports in 1861 amounted to but $584,995,066, while in 1905 their value was $2,636,074,737.

Our foreign shipping under register last year was substantially less than that of the year 1810, ninety-six years ago.

When the first congress met, under the present constitution, in 1789, foreign ships carried the great bulk of our imports and exports, as they do now. Remedial measures, such as discriminating import duties, and discriminating tonnage dues, the denial of American registry to foreign-built vessels, all of a protective character, led to the rapid upbuilding of our shipping, so that in a short time our own vessels carried an average of 90 per cent of our imports and exports. So long as the protection remained our ships continued to carry this vast proportion of our foreign commerce. Nothing prospered like our shipping. It gave strength, wealth, prestige, and position to the nation and helped it to fight its battles.

The history of American shipping is a record of the triumph of protection. In the years that it was protected it grew and prospered; in the years that it has been unprotected it has shrunk and has been unprofitable. Free trade has been the bane and protection the antidote of our shipping.

The republican party is the party of protection; but it has neglected to give protection to our shipping upon the seas, although successive national platforms have pledged the party to the early enactment of such legislation as is necessary.

### DEEP CONCERN FOR OUR SHIPPING.

Successive presidents of the United States from Jefferson to Roosevelt, have expressed their deep concern for our shipping. It is painful to state that it has fallen to the lot of republican presidents to record a steadily diminishing tonnage of American shipping in the foreign trade. In addition to President Roosevelt's recommendation to congress at the present session that adequate legislation be enacted for our deep-sea shipping, three officers of his cabinet join with him in calling attention to conditions and in urging remedies.

Two years ago President Roosevelt, who had pleaded with previous congresses for the enactment of protective shipping legislation without result, called attention in his annual message to the fact that our people are a unit in behalf of an American mercantile marine, but are divided as to the method by which to secure it. He therefore recommended the appointment of a commission to investigate the subject and report to congress. Promptly such provision was made. The commission thus created consisted of five senators and five representatives, six republicans and four democrats. It held public hearings in the chief Atlantic, Pacific, gulf and lake ports of the country securing information and suggestions wherever obtainable, all of which is to be found in the three volumes of the commission's report, copies of which are in the club's possession. This (the first) report was made to congress in January, 1905, but as it was seen that no action on the measure was practicable at the last session, the commission has continued, by special act, to report at the opening of the present congress. This it did, in each case presenting a bill to carry into effect the recommendations of the report. All of these several reports are in the possession of the club, and have been consulted in the preparation of this report.

The Congressional Merchant Marine Commission's bill, although before the country for a year, has called forth unstinted praise and but little adverse criticism. It has been equally popular in congress. It was referred to the usual committees at the last session, and promptly reported favorably to each branch. Not all of the minority members of the house committee to which it was referred concurred in the minority report; and in the senate committee the minority report was signed by six members. At the present session the senate commerce committee favorably reported the bill and after extended and full discussion it was passed on Feb. 14, 1906, by a vote of 38 for to 27 against. As we write the house merchant marine and fisheries committee has not yet acted upon it. In all probability it will again report it favorably, as it did at the last session, and it is hoped that it may receive early consideration and prompt passage through the lower house of congress.

When the report of the Merchant Marine Commission was made a year ago the minority members objected to but one great feature of the bill and even in that the minority was not united. No minority report has been made on the bill last presented to congress by any member of the commission.

### PROVISIONS OF MERCHANT MARINE BILL.

The Merchant Marine Commission bill provides: 1. A national naval reserve drawn from our merchant shipping and fisheries, composed of 10,000 men to whom shall be paid annual retainers, as is the practice in other countries, and who shall be subject to naval instruction and discipline and at the call of the government in the time of war. 2. The creation of new American steamship lines from Atlantic ports to South Africa, South and Central America; from gulf ports to Cuba, Mexico, Central America and to Brazil; from Pacific ports to Japan, China and the Philippines, also from the Pacific coast to Hawaii, Japan, China and the Philippines, and additional compensation to a line now running to Hawaii, Samoa, New Zealand and Australia. The ships of these lines will greatly increase our foreign markets, afford a large number of vessels suitable for naval auxiliaries, troop ships, colliers and the like, besides affording employment for a large number of our ship builders, ship masters, officers and seamen. 3. The payment of $5 a ton to cargo vessels engaged for a year in the foreign trade, $4 if engaged for less than a year and more than nine months, and $2.50 a ton if engaged for less than nine and for more than six months. This provides for cargo as distinct from mail carrying vessels, and is the one feature of the bill which the democrats oppose. The ground of objection is the alleged unconstitutionality of a bounty, although a bounty to American fishermen was provided for in 1792

and continued with several amendments, all under democratic administrations, until 1866. The minority in lieu of this provision last year recommended a return to the old policy of discriminating duties, so abridged, however, as to rob it of all its possible benefits. It proposed to make no discrimination in respect to our non-dutiable imports, which constitute about 45 per cent in value and 65 per cent in bulk of all our imports. In respect to dutiable imports, if brought to us in the ships of the country of their growth, production and manufacture, they were to enjoy the same reduction in duty that was proposed for American vessels. As most of our dutiable imports come from countries having a merchant marine of their own, naturally they would be sent here in their own ships, and American ships would gain no advantage there; and while the opportunities are much greater for American ships in the trade of those countries from which our non-dutiable imports come, because those countries have little or no shipping of their own, in respect to such imports no discrimination was proposed. If a duty were placed upon such non-dutiable imports, when brought in foreign vessels, it would soon divert such imports to American vessels, but the minority stated it would not consent to that.

The minority report submitted to the senate on the pending bill recommends no alternative policy whatever, thus being radically different from that submitted a year ago. On the other hand, Senator Mallory, who is credited with the preparation of the senate commerce committee's minority report made an elaborate speech in the senate advocating a complete readoption of the old discriminating import duties and tonnage dues policy, without abridgement. But there is nothing to indicate that he is supported in that position by his colleagues on the democratic side except in the case of Senator Patterson, who advocated a reduction in duty on dutiable imports, but who proposed no change in respect to non-dutiable imports.

SENATOR MALLORY'S SPEECH.

In his speech against the bill Senator Mallory several times assert that its provisions, as to subsidies for mail lines, and as to bounties for cargo carriers, are insufficient to attract American capital into them for the foreign trade. These statements coming from a strong opponent of the bill are deserving of reproduction.

As to the provision for cargo vessels he says:

"In the first place the amount which is donated is too small . . . Five dollars a ton in my judgment . . . and I know it can be demonstrated . . . for twelve months service in running a ship of any size is entirely too small an amount to meet the disparity which exists between the operating expenses and the original cost of vessels in the United States and vessels under foreign flags. I do not believe Mr. President, that $10 would be sufficient to meet that disparity and put the American ship on an equality with the foreign ship." . . .

As to the provision for mail-carrying steamships, he says:

"But the senator (Mr. Gallinger, of New Hampshire) called my attention to the postal subsidy. I do not find any fault with the postal subsidy. I think it is one of the best features of this bill. The senator knows that I acquiesced readily as a member of the commission. The only fault I ever found with that is that I do not think we give postal subsidy enough. I would vote readily to increase the subsidies that are provided for from the Gulf of Mexico, because I doubt very much whether you will establish the lines that are sought to be established to Brazil and Argentine on the small subsidy that is given." . . .

Senator Gallinger, on the other hand published statements from ship owners of unquestioned reliability, saying that, while the subsidies and bounties might not quite suffice to make up the difference, they would yet suffice to induce them to build vessels for the foreign trade, in the hope through rigid economy in operation, to take out a profit eventually.

The United States now saves $2,500,000 on its ocean mail carriage each year. It is the only great nation that makes such a saving. Great Britain loses about $2,500,000 annually over what she receives in ocean postage . . . She pays that much more for ocean mail transportation than she receives from ocean postage. But Great Britain possesses the ships and we do not. We save on ocean postage, but we are without ocean ships.

HOW THE BILL WOULD OPERATE.

The first year's operation of the bill will cost the government nothing, if the item of increased tonnage dues, ommitted from the bill in the senate because revenue-producing measures cannot constitutionally originate in the senate, is restored by the house, as we hope it will be. The second year the cost would be less than two millions. The tenth year it would work up to between seven and eight millions, averaging slightly in excess of four million annually for ten years. Deduct from this at least $25,000,000 excess of ocean postage over expense of ocean mail carriage, and add to it the revenue from increased tonnage dues, and it will be seen that the cost of a trial of the bill will be comparatively unimportant.

This presents to the republican club of the city of New York the present status of American shipping in the foreign trade and a fair summary of the bill as drafted by a painstaking, honest, well-informed body of national legislators, appointed pursuant to President Roosevelt's recommendation to devise a method by which to build up our shipping in the foreign trade.

The argument advanced by some opponents of subsidies that it is taxing the whole people for the benefit of a class is not well founded. The whole country is taxed for our mail subsidies on land, for the improvement of rivers and habors, and for public buildings which are used only by a small part of our population, and yet in broad sense they are for the general good.

No one questions the patriotism of the citizens of any section of our great country, but when we get a business question into the tides and currents and whirlpools of partisan politics it is often sucked down to destruction. Congress will vote unanimously eighty or ninety millions a year for a navy, but when it comes to voting five millions a year for a commercial navy, which would be nearly self-sustaining in the time of peace, and be a militia of the seas in time of war, some of our representatives hesitate. Ten per cent of the expense of maintaining our navy expended on building up our commercial marine would double the efficiency of our navy. A commercial marine would be a nursery for seamen and mechanics necessary in the navy. We are willing to vote unanimously a hundred or two hundred millions for an Isthmian canal for the merchant marine of other countries to use but hesitate to vote a small part of that sum to build up an American merchant marine to use it.

CHEAP TRANSPORTATION IS A NECESSITY.

In order to find a market at remunerative prices for the surplus products of our fields, forests, mines and factories, we must have cheap transportation. We have got it on the land, and should have it on the sea. It is the one missing link in the chain of facilities which will enable us to conquer the commercial world. British ship owners were greatly alarmed at the prospect of the passage by our congress of the Hanna-Payne subsidy bill, and estimated that its effect would be to reduce ocean freights within a few years 25 per cent. We pay over $200,000,000 a year in ocean freights, principally on our agricultural products. Twenty-five per cent of this is $50,000,000. Would it not be good

business to spend $5,000,000 a year to save $50,000,000?

Furthermore, every ship is a missionary of trade and steamship lines work for their own countries just as railroad lines work for their own territories. Competing merchants do not employ competitors' wagons to make their deliveries.

By subsidies in land, money and mail pay we have developed the finest railway system on the face of the earth, a system which carries our products for much less than the freight rates of the railways of other countries, and passengers with an economy, speed and comfort unknown elsewhere in the world.

On the sea we have starved our carriers, and the percentage of American products carried in American ships has dwindled from 90 down to 12 per cent, and this with a country having the greatest sea coast in the world; a nation with maritime instincts, with an unbroken record of skill and intrepidity on the ocean, from Paul Jones to George Dewey; a nation whose ship builders made the name of "American clippers" famous, and who sent a little schooner called America across the ocean and won the "Queen's Cup," which the ship builders of Great Britain have tried unsuccessfully ever since to win back.

Will the patriotism and the business common sense of the American people continue to starve our merchant marine, or will they endorse the view of Jefferson, Calhoun, Harrison, McKinley and Roosevelt, all of whom believed in fostering our shipping, and endorse the sentiment expressed in the dying words of our gallant Lawrence, "Don't give up the ship."

Believing that the republican club and a majority of the American people are desirous of seeing a great American merchant marine established upon the seas, useful in peace and indispensable in war, and believing that our members are willing to accept the meritorious measure devised by the congressional merchant marine commission, your committee on national affairs takes pleasure in commending the reports and bill of that commission, and renews its recommendation that the club concur in this approval, and that this approval be expressed to members of the house of representatives and to the president of the United States, and that that hope be expressed that the bill may command the support of every member. We further recommend that copies of this report be transmitted to the press of the United States, and to kindred organizations with a request for its consideration and such support for the merchant marine shipping bill as in their opinion its merits deserve.

Respectfully submitted by the committee.

Attest, REUBEN LESLIE MAYNARD, secretary.

## AROUND THE GREAT LAKES.

The machine shop and warehouse of No. 4 dock at Ashtabula harbor, was destroyed by fire this week.

The Boutell Wrecking & Towing Co. has sold the tug Peter Smith to Frank Perry, of Sault Ste. Marie.

Mr. James Nacey, of Cleveland, is holding a survey of the steamers John Crerar and H. G. Dalton at Buffalo. These boats have been chartered to carry steel rails.

A Washington dispatch announces that Capt. Fred J. Meno, of Port Huron, has been selected to succeed J. B. Cottrell, deceased, as inspector of hulls at Port Huron.

Capt. L. A. Rand will sail the steamer Abraham Stearn, now building at the Superior yard of the American Ship Building Co., for W. A. and A. H. Hawgood, of Cleveland.

The launch of the steamer James Laughlin at the Ecorse yard of the Great Lakes Engineering Works has been postponed until April 7, owing to the inability of certain interested parties to be present at the date originally set, which was March 31.

The steel steamer Theodore Roosevelt, building at the yard of the Toledo Ship Building Co. for the Indiana Transportation Co. will be launched at eleven o'clock on Saturday.

The steamer Harvey D. Goulder, building at the Lorain yard of the American Ship Building Co., for the Hawgood Transit Co., of Cleveland, will be launched at noon on Saturday. A special car will leave the Public Square at ten o'clock for the launch.

The L. P. & J. A. Smith Co., of Cleveland, one of the most progressive dredging companies of the lakes, will be further developed through the introduction of new capital into the business. The details of the reorganization will probably be announced next week.

Wm. Tullock, a sailor, was lost on the lakes about thirty years ago, having sailed from Oswego, N. Y., on a vessel that foundered. His wife, Mrs. Wm. Tullock, 1252 Broadway, Toledo, O., is now endeavoring to get information concerning this disaster. Does anyone recall it?

The iron passenger steamer Mascotte has been sold by the Delray & Belle Isle Ferry Co. to a company composed of Capt. Wm. Lloyd, Capt. Burt Roberts, of Houghton, and Capt. John Wright, of Duluth. She will ply on Portage Lake and also run to L'Anse, Lake Linden, and the Huron islands.

The Chicago Navigation Co. has been incorporated at Duluth with the following officers: D. T. Helman, president; L. M. Jenks, vice president; J. W. Wood, second vice president; H. R. Spencer, secretary; R. C. Helm, treasurer. The company is to operate freighters now building by the American Ship Building Co.

Contracts for dredging the harbors on the east shore of Lake Michigan and for making the cut from the new Saugatuck channel to Lake Michigan have been awarded to the Great Lakes Dredge & Dock Co., of Chicago. The harbors to be dredged are Michigan City, White Lake, Pentwater, Manistee and Arcadia.

Congressman Burton introduced two bills of importance to navigation on the great lakes in congress this week. The first provides for the establishment of a steam light vessel on Martin's Reef, in the northwestern end of Lake Huron at a cost of $35,000; the second provides for two range lights in the 20-ft. channel in Lake St. Clair at a cost not to exceed $18,000.

The Toledo Ship Building Co. has closed contract with the Lyman C. Smith Transit Co. for a steel freighter of 7,500 tons capacity. It is reported that the company will build a second steamer for a syndicate formed from among the members of its own company. It is understood that this steamer will be designed by Mr. Frank E. Kirby, along somewhat unusual lines, as a bulk freighter.

The Chicago & Milwaukee Steamship Co. has been organized with a capital stock of $200,000 to operate a steamship service between Chicago, Milwaukee and Racine, Wis. Capt. John G. Keith, of Chicago, is president of the new company and Myles Barry, vice president and general manager. The company has purchased the steamer Peerless and is now negotiating for the purchase of another vessel.

The comforts and conveniences which Mr. Frank E. Kirby has provided for patrons of the new D. & C. steamer have been reinforced by private verandas for the parlors on the second deck. These parlors are nearly flush with the rail, so that passengers cannot promenade past them. Occupants of the parlors may sit outside the door and enjoy as much privacy as on their own porches. They may sleep outside if they desire.

## SCIENTIFIC LAKE NAVIGATION.

Clarence E. Long's course of instruction in scientific lake navigation will begin in the next issue of the MARINE REVIEW. Mr. Long is a practical navigator. He is not a graduate of any college, but picked up his knowledge at first hand. What he got out of books he says any lake master can get out of them. Mr. Long recognized however, in his studies, the fact that no simple work on lake navigation existed. He had to extract his information from ponderous volumes on navigation in general. He saw at once the need of a simple work devoted to the navigation of the chain of lakes, free from all extraneous matter, and he set about to prepare it. He published monthly at Sturgeon Bay a little nautical magizine in which he gave his instructions clearly, and these numbers he is now binding into one complete volume. The course published in the little magazine will be amplified by the MARINE REVIEW, and in addition a question and answer department will be instituted which every master on the lakes is invited to address. No one master can ask a question without bettering everyone. Careful attention to this course will make every master on the lakes a better navigator.

---

Navigation is one of the most interesting sciences we have, and it surprises one to find how quickly a knowledge of the same may be obtained when it is explained in a simple, common sense way by one who understands the theory and practice of the science.

---

All that is necessary is to preserve each number of the MARINE REVIEW, and as these papers contain all the essential information on the different subjects on which they treat, it is evident that, as a whole, these papers will constitute a valuable assemblage of facts, formulas and processes of the study, and will serve as a reference work and be of incalculable value to the student.

---

The originality of Long's methods, the simple rules for solving the various problems, and the correct principles upon which they are based, have been greatly appreciated by the lake nautical profession. We have ever dealt with the science in such a common sense, practical and business-like way, as to make the once abstruse calculations appeal clearly to the intelligence of the sailor, who is a stranger to the various formulas given in almost all works on navigation. The scientific formulas upon which the various problems are based are not considered, but clear, common sense explanations are given in their stead, so that the subjects become intelligible and are adapted to the needs, both of men with a limited education and those of technical training.

---

There are those that will probably argue that navigation cannot be used to advantage here on the lakes. Deep-sea navigation by astronomical observation, i. e., finding the position of the vessel—latitude and longitude—by observing the heavenly bodies, cannot be used to a practical advantage, the distance on the lakes being too short to permit it. But this is not all there is to the science. On the lakes the compass is the paramount study, and it is of the greatest importance to the navigator. It is a study all by itself, and is one of the deepest in the entire nautical sphere, requiring and involving a greater amount of knowledge and covering a wider field than any other single subject of the science. It is, in fact, the foundation upon which the science is based. Owners, ship builders and masters do not bestow on the compass the amount of consideration which it justly merits. It is preeminently the instrument upon which the safety of the vessel depends, and justly ranks first in importance.

As to their ability as pilots and seamen, lake captains have not their equals in the world. The manner in which they handle their boats through the intricate waterways connecting the lakes; or bringing them alongside of a wharf invariably brings forth praise from those who see it and are competent to judge. All then that the lake captain lacks in filling every need of his station is the science of lake navigation.

---

Bear this in mind: Increase your learning and you increase your earning power. The world has large rewards for the man that can do things—and it is only the man who knows the why and the how who accomplishes things easily, quickly and accurately. To properly fill the various berths on board ship a man must know both the theory and practice of his calling. Our navigation course by self-instruction enables you to increase your income by imparting practical, useful and necessary information in your work at a very small cost. Start right by getting the right foundation—master the scientific principles underlying your work. To advance you must know "why" as well as "how." Perfect yourself in your chosen vocation—master it and you will eventually reach the top ratline.

---

The more knowledge a man has the better he is prepared to fill any position he is called or necessitated to fill in the various pursuits of life, from that of the most menial to that of the most honorable; and it must be apparent to all that the more proficient a sailor, wheelsman, mate or captain is in the science of navigation, the more profitable, safe and desirable man he is to his employer and himself. Vesselmen and insurance men are becoming more and more convinced of this fact and mariners themselves see and realize it.

---

Navigation is a book study, and a man might just as well go to sea to learn to read and cipher as to expect to acquire a correct knowledge of navigation on the deck of a vessel. Do not confound navigation with seamanship. The place to learn seamanship is on ship board. The average practical lake man is a first-class seaman, but a poor navigator.

---

Many men imagine that navigation is a very difficult study, and a great amount of time is necessarily consumed in learning the science, but this is a mistaken idea. Practical navigation is extremely simple and may be learned quickly. Therefore, let it be understood that any man, however limited his education, may, provided he possesses ordinarily intelligence, learn practical navigation and become a competent navigator in a very short time.

---

Our great point in all the exercises of this navigation course is to lead the student directly and easily to a clear comprehension of the steps in the various solutions and the necessity for them. These solutions are accompanied with explanations, illustrative and otherwise, which enable the student to comprehend all that he needs to know about the "whys" and the "wherefores" of the operations. By these means the student is led to employ the simplest methods of solution because they are generally natural methods, and to understand and explain every step in the process. A student who has been trained in this manner will never forget a process or rule, because he can devise the process and frame the rule at will.

---

Joseph Supple, Portland, Ore., is building a new steamer for the Kitsap Transportation Co., of Seattle, Wash.

## TO PRESERVE NIAGARA FALLS.

If Niagara Falls are to be preserved as one of the wonders of the world immediate action by the United States and Canada is required, according to the findings of the American members of the International Waterways Commission, which has for the past year been studying the conditions at the falls and in the tributary great lakes. This report is signed by Gen. O. H. Ernst, chairman, and the other American members of the commission.

After a brief description of the physical conditions the report gives a detailed account of all the corporations now engaged in the development of power with the quantities of water which they are actually using, the amounts which they are preparing to use, and the amounts which they are authorized under their charters to use. It includes not only corporations taking water directly from Niagara river, but also those drawing water for power purposes from the Erie canal and the Welland canal; also the Chicago drainage canal; and furnishes a list of all franchises granted and not perfected. The report says:

"The total quantity of water to be taken from the river by works authorized is 60,900 cubic feet per second. Of this amount 26,700 cubic feet is to be taken on the American side and the remainder, 34,200 cubic feet, on the Canadian side. That is, 27 per cent of the average discharge and 33 per cent of the low water discharge of the Niagara river will cease to pass over the falls when these works are completed and in full operation. The quantity to be diverted is more than double the quantity which now passes over the American fall. That this will in general have an injurious effect on the falls seems self-evident. The volume of water to be diverted is about the equivalent of the entire discharge of Lake Superior over the Sault Ste. Marie.

NO ADDITIONAL DIVERSION.

"To foretell with accuracy the effects in detail of the full diversion authorized would require a more complete knowledge of the bed of the river than is now obtainable. The water taken on the Canadian side below the crest of the rapids will affect the Horseshoe fall alone. If all that taken on the American side should affect the American fall alone it would practically leave it dry; but it seems probable that only a part of this diversion will be at the expense of the American fall. Exactly what form the changes in the two cataracts will take, whether they will be narrower or be broken up into a great number of streams or simply be reduced in volume, retaining in general their present form, can not now be foretold for the reason that there is no accurate knowledge of the form of and depth of water in the crests. If 60,900 cubic feet per second be diverted, the loss will be important, but if the diversion be limited to this amount or reduced as hereafter indicated, it may not prove disastrous. This can not be definitely determined until the works now under construction have been completed and put in operation. When that happens, if it be found that the falls have not suffered serious damage as a scenic spectacle, it does not follow that additional water may be diverted with impunity. Additional diversion would be an experiment even more dangerous than that now being tried and in our opinion should not be permitted.

"In return for the impairment of the falls thus far authorized the state of New York will receive practically nothing for the 342,000 horsepower authorized on that side, and the Queen Victoria Niagara Falls Park will receive an annual rental of $270,000, or an average of sixty-five cents per horsepower for the 415,000 horsepower authorized on the Canadian side. These figures do not include the 8,000 horsepower being developed by the electric railway, nor the power developed by the Hamilton company with water from the Welland Canal."

The report closes with the following summary:

"The glory of Niagara Falls lies in the volume of its water rather than in its height or in the surrounding scenery.

"Works are now authorized and partially completed at the falls which will divert from the Niagara river about the falls above 27 per cent of the average discharge and about 33 per cent of the low water discharge, which is more than double the quantity now flowing over the American fall. In addition to this, water naturally tributary to the Niagara river is being diverted through the Chicago drainage canal and for power in addition to navigation purposes through the Erie and the Welland canals. The effect of this withdrawal of water is to injure both the American and the Horseshoe falls in nearly equal proportions. While the injury will be perceptible it may not be destructive or disastrous.

LOSS OF SCENIC SPECTACLE.

"Improvements in the transmission of electric power and increased demand will make a market for all the power which can be developed at Niagara Falls, and will cause a destruction of the falls as a scenic spectacle if the development be allowed to go on unchecked. Charters have been granted to corporations which propose to divert additional amounts in quantities now limited. The sums of money invested or being invested in the works now in operation or under construction and in the industries dependent on them amount to many millions of dollars. It is probably not expedient to attempt the withdrawal of the rights thus utilized. The commercial value of the water power at Niagara Falls is very great, but if compared with values set aside by wealthy communities elsewhere for park purposes this value is not too great to be devoted to similar purposes. The place is visited annually by about 800,000 people.

"If the falls are to be preserved it must be by mutual agreement between the two countries. As a step in that direction we recommend that legislation be enacted which shall contain the following provisions, viz:

"The secretary of war to be authorized to grant permits for the diversion of 28,500 cubic feet per second, and no more, from the waters naturally tributary to Niagara Falls, distributed as follows:

"Niagara Falls Hydraulic Power & Manufacturing Co. 9,500; Niagara Falls Power Co., 8,600; Erie Canal or its tenants (in addition to lock service), 400; Chicago Drainage Canal, 10,000. All other diversion of water which is naturally tributary to Niagara Falls to be prohibited, except such as may be required for domestic use or for the service of locks in navigation canals. Suitable penalties for violation of the law to be prescribed.

"The foregoing prohibition to remain in force two years, and then to become the permanent law of the land, if in the meantime the Canadian government shall have enacted legislation prohibiting the diversion of water which is naturally tributary to Niagara Falls, in excess of 36,000 cubic feet per second, not including the amounts required for domestic use or for the service of locks in navigation canals. It is assumed, however, that an understanding on this subject would be reached by treaty.

TREATY IS RECOMMENDED.

"The object of such legislation would be to put a stop to the further depletion of the falls, and at the same time inflict the least possible injury on the important interests now dependent on this water power. The amount to be diverted on the Canadian side, 36,000 feet, has been fixed with a view to allowing to the companies on that side the amounts for which they have works under construction.

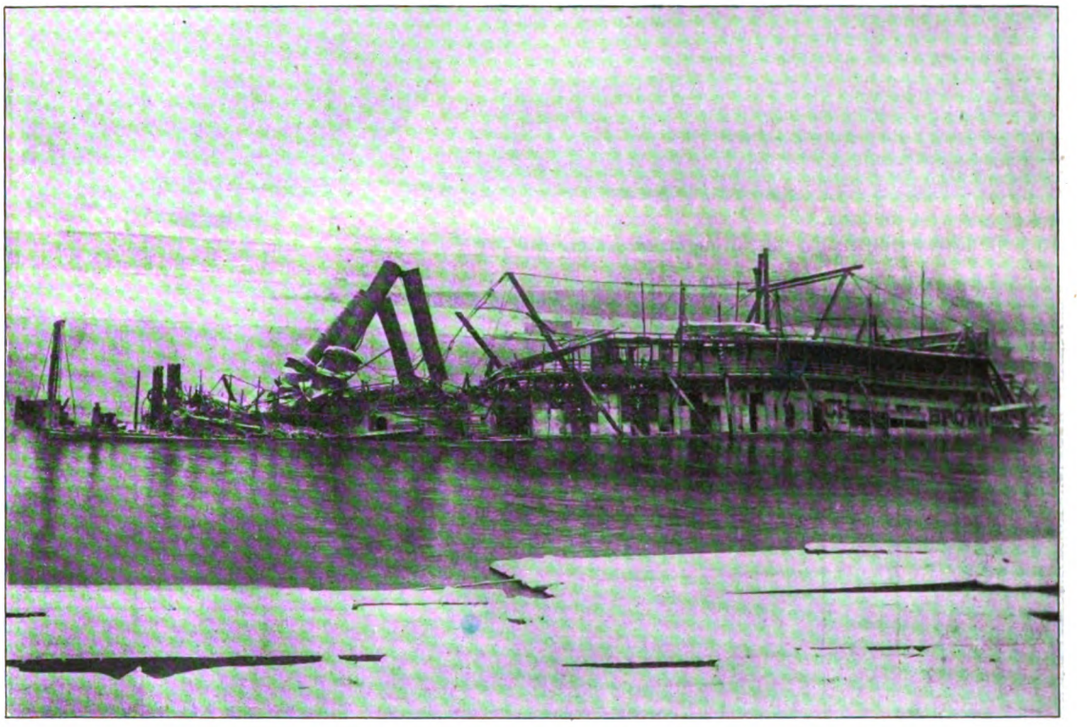
"Such legislation would give to Canada the advantage of diverting 7,500 cubic feet per second more than is diverted in the United States. The advantage is more apparent than

real, since the power generated on the Canadian side will, to a large extent, be transmitted and used in the United States; in the negotiation of a treaty, however, the point should be considered.

"The substance of this report was submitted to our Canadian colleagues before the passage of the joint resolution with a view to uniting in a joint report under the general law providing for the commission. There was a substantial agreement in the statement of facts and such differences as developed with respect to the recommendations which ought to be made did not seem insuperable, but our colleagues desired time for further consideration. We have no doubt of their sympathetic interest in carrying out that part of the instructions contained in the resolution which requires us 'to exert in conjunction with the members of said commission representing the Dominion of Canada, if practicable, all possible efforts for the preservation of Niagara Falls in their natural condition.'"

## WRECK OF THE TOW BOAT CHARLES BROWN.

The accompanying illustration shows the wreck of the tow boat Charles Brown, sunk in the Ohio river at Lysle's landing, Allegheny, last week while steam was being raised preparatory to taking a tow of coal barges to southern river ports. The Charles Brown is one of the largest tow boats owned by the Monongahela River Consolidated Coal & Coke Co. She was built in Pittsburg in 1872 and measured 200 ft. long, 32 ft. beam and 6 ft. depth. The boat will be raised and repaired. The Brown is one of the familiar stern wheel "push-water" craft used in the river trade and the fire destroyed the forward part about the boilers.



WRECK OF TOW BOAT CHARLES BROWN.

## WORK AT POLSON'S SHIP YARD.

The present season at Polson's ship yard, Toronto, has been one of the busiest in the history of the company, and many of their large contracts are now nearing completion. The new steel double-ended ferryboat for the Toronto Ferry Co. will be ready for launching in about two weeks. It has a length of 150 ft. and a guaranteed speed of 10 miles per hour. The hydraulic dredge for the Dominion government for use at Prince Edward island is also being constructed. This dredge is of very powerful construction, has a 24-in. discharge pipe and will discharge through 2,000 ft. of floating steel piping and pontoons. The dredge will be ready by the opening of navigation, and will be towed from Toronto to her destination by tugs sent by the government from the St. Lawrence.

A 15-in. suction dredge is being built for the city of Toronto for work in and around the harbor, principally in connection with the island improvements. There will be 1,000 ft. of steel piping and pontoons through which the discharge can be made. Among other contracts are those for a shallow-draught stern-wheel steamer for Lake St. John, Quebec; the steel frame and machinery for a passenger steamer for the Maganetawan Navigation Co., and a snag-boat for the river at Selkirk, Man. The machinery is also being furnished for two large 200-ft. stern-wheel steamers for the Canadian Pacific railway for use in the Kootenay district, also the machinery for a large tug for J. B. Smith & Sons.

## SILVER SERVICE FOR CRUISER CALIFORNIA.

The new and formidable cruiser California is rapidly approaching the finishing touches, and will soon be ready to make her official trial trip. The question of presenting the new vessel with a magnificent silver service is being actively agitated. Committees have been appointed and steps are being taken to raise at once the necessary funds. It is estimated that the sum of $25,000 will be necessary to provide the new war vessel with a suitable silver service. As the new vessel has been "adopted" by the state of California, the "Native Sons and Daughters of the Golden West" stand pledged to raise a considerable proportion of that sum.

The Northern Steamship Co. operating the North West and the North Land, have arranged its schedule for the coming season. The North Land will run to Chicago and the North West to Duluth, the season beginning on June 21.

## LAUNCH OF STEAMER HARRY COULBY.

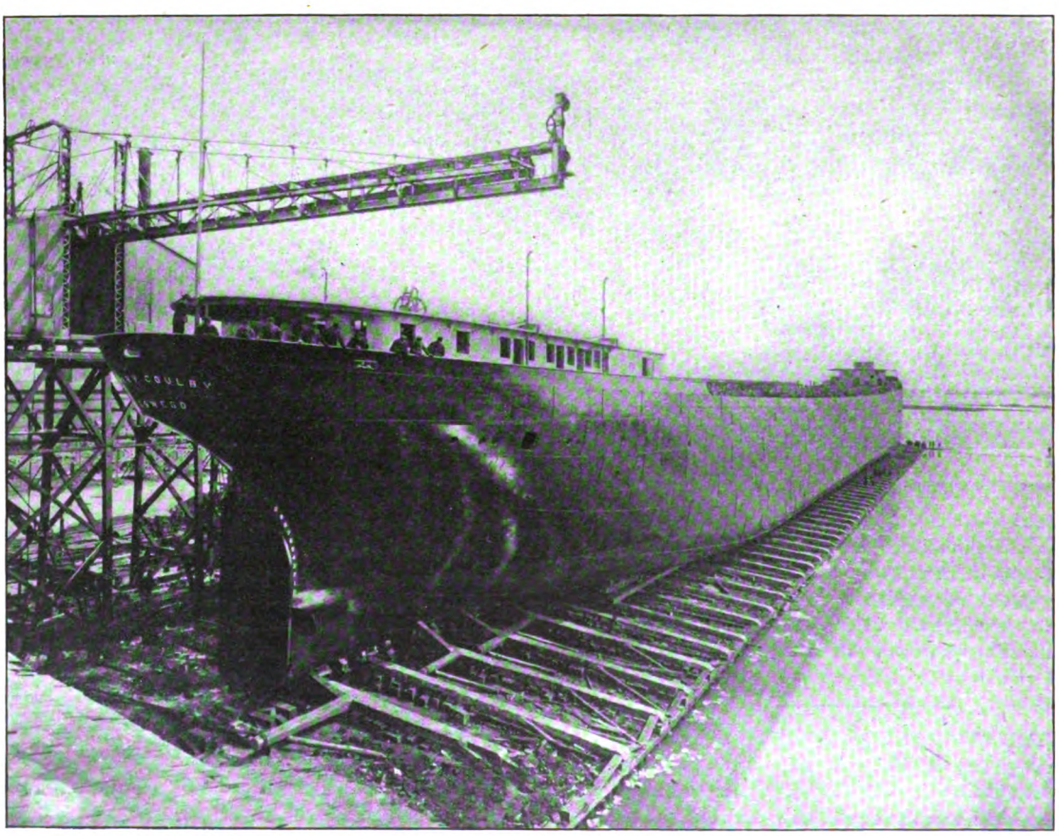
MISS FLORENCE LIVINGSTONE.

The launch of the steel freighter Harry Coulby at the Wyandotte yard of the American Ship Building Co. on Saturday last, was a success in every way. The great steamer was christened by Miss Florence M. Livingstone, daughter of President Wm. Livingstone of the Lake Carriers' Association, and was named in honor of the president and general manager of the Pittsburg Steamship Co. The Coulby is building for the Lyman C. Smith Transit Co., and will be ready to go into commission at the opening of navigation.

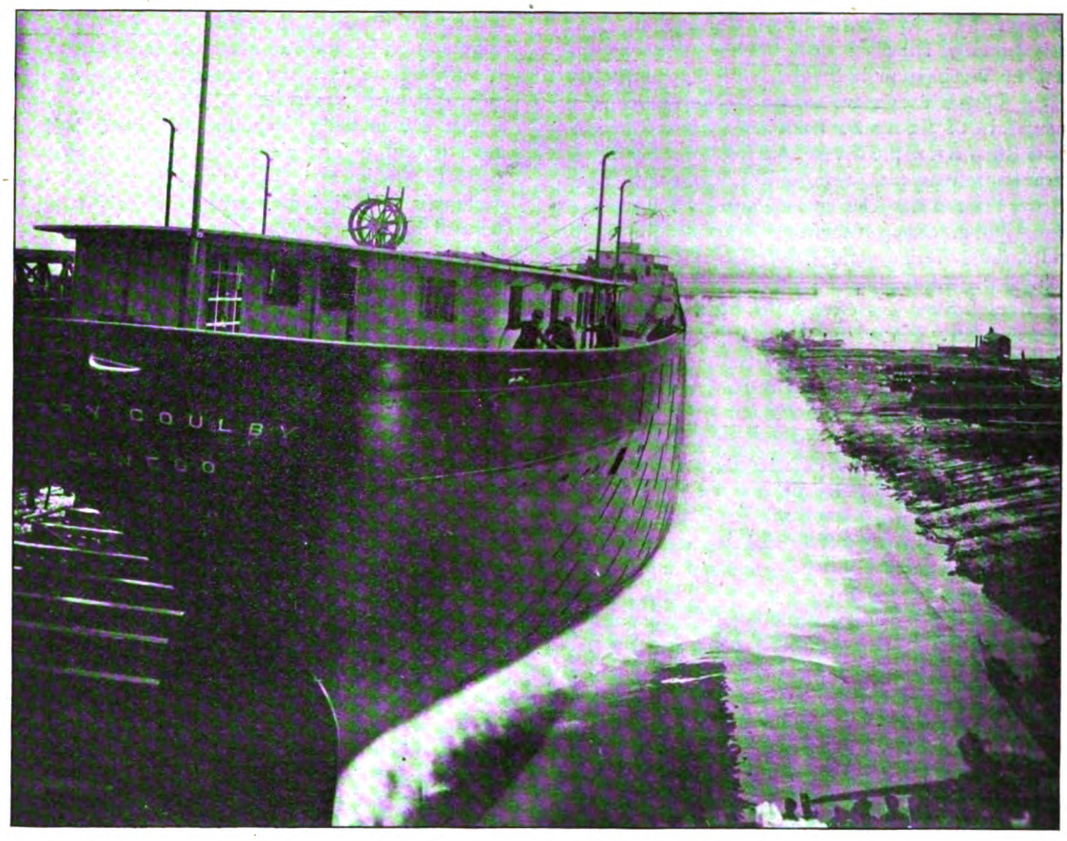
The new steamer is a duplicate of the four which were built by the American Ship Building Co. last year, for the Pittsburg Steamship Co., that is to say, the Gary, Cory, Frick and Perkins. The Coulby is 569 ft. over all, 549 ft. keel, 56 ft. beam and 31 ft. deep. She will have thirty-four hatches, spaced 12-ft. centers. Her engines will be triple expansion with cylinders 24, 39 and 65 in. diameters by 42 in. stroke, supplied with steam from two Scotch boilers, 15 ft. 4 in. diameter and 11½ ft. long, allowed 180 lb. pressure, fitted with Ellis & Eaves draft. On the draught of water now obtaining she will carry nearly 11,000 tons of ore.

Owing to inclement weather the attendance at the launch was light. Among those present were: Charles Cotton of

MR. HARRY COULBY.



THE STEAMER HARRY COULBY ON THE STOCKS.



LAUNCH OF THE STEAMER HARRY COULBY. 

the United States navy; Mr. Harry Coulby, Mr. Harvey D. Goulder, Capt. John Mitchell, Mr. J. Burton Ayers and Mr. E. P. Lenihan, of Cleveland; Mr. Lyman C. Smith, Mr. W. L. Smith, and Mr. Scott, of Syracuse; Mr. G. A. Tomlinson, of Duluth; Capt. J. J. H. Brown, of Buffalo; Mr. and Mrs. Wm. Livingstone, Mr. and Mrs. C. A. Warren, Mr. and Mrs. Eber Cottrell, Miss Susie Livingstone, Miss Sara Angell, Miss Annie Leonard, Miss Louise Patterson, Miss Adelaide Sutter, Mr. C. H. Westcott, John B. Whelan, Mr. J. L. Hudson, Mr. George T. Moody, Mr. James B. McKay, Mr. Antonio C. Pessano, Mr. Walter E. Campbell, Mr. J. E. Danaher, Capt. Duncan Nicholson and Mr. Morris McMillan, of Detroit, and Hon. Peter White of Marquette, Mich.

Following the launch luncheon was served at the Detroit club, at which Mr. Harvey D. Goulder acted as toastmaster. The Coulby will be sailed by Capt. Ralph J. Lyons of Lorain, and Mr. E. Hull of Buffalo will be her chief engineer.

## MR. S. H. PITKIN GENERAL MANAGER.

At the recent annual meeting of the Wellman-Seaver-Morgan Co., of Cleveland, O. the office of general manager, which has been vacant since the death last June of Mr. Charles H. Wellman, was filled by the election of Mr. S. H. Pitkin, whose present title will be first vice president and general manager. Otherwise no changes were made in the officers of the company.

Representative McMorran, of Port Huron, has introduced a joint resolution in the house directing the secretary of war to cause an examination and survey to be made for a channel between Russell's Island and Grand Point in the St. Clair river, for the purpose of obtaining the shortest direct channel. The resolution has the approval of the war department.

The steamer Atlanta which was burned on Lake Michigan last week had been inspected by the steamboat inspection service but a few days before the disaster and was found to be fully equipped with all fire fighting and life saving devices. Capt. McCauley, of the Atlanta, is of the opinion that the fire started with an explosion of some sort. The captain is commended for promptly stopping his ship and turning his entire attention to fighting the fire. There were no passengers aboard at the time, the crew numbering nearly seventy persons. Capt. Frank Van Patton, inspector of hulls, and Wm. A. Collins, inspector of boilers, are undertaking an investigation into the cause of the disaster.

The Milwaukee life saving station will be opened for business at midnight March 31. Other stations will speedily go into commission, but Milwaukee is the first one actually ordered into commission. The life saving crews this year will operate under somewhat different conditions than obtained last year. For instance, instead of being allowed twelve hours time on their day off, the members of the crew will be allowed twenty-four hours time. The effect of this is to virtually make the life-saving crew one man short continually throughout the season. As a matter of fact, with one man continuously on patrol duty it makes the crews two men short in case there is actual life-saving work to be done.

The Maryland Steel Co., Sparrow's Point, Md., is to build a passenger and freight steamer for the Boston & Philadelphia Steamship Co., to be 290 ft. over all, 276 ft. keel, 42 ft. beam and 27 ft. 3 in. deep, equipped with triple expansion engines with cylinders 28, 45 and 72-in. diameters by stroke of 40 in., supplied with steam from four Scotch boilers, 13 ft. 9 in. diameter and 12 ft. long, allowed 180 lbs. pressure.

## FROM LAKES TO GULF.

The movement for deep water from Chicago to New Orleans was formally launched at a dinner party at the Raleigh hotel, in Washington last week, with Representative Lorimer, of the Illinois delegation as host. The guests were limited to members of the house from the city of Chicago, members from Illinois on the rivers and harbors committee and those representatives who were on the Mississippi river inspection party last fall. The guests were: Representatives Madden, Mann, Snapp, Wharton, MacGavin, Wilson, Knoppf, Smith, Foss, Rainey and Graff, all of Illinois, and Mr. Humphreys, of Mississippi.

Temporary organization was effected by making Mr. Lorimer chairman and Mr. Rainey secretary. It was decided to hold a convention in St. Louis Nov. 15 and 16, and the official designation of the movement will be "The Lakes to the Gulf Deep Waterway Convention."

Delegates to the convention will be selected by the local organizations at the different points visited by the Mississippi river inspecting party of last fall. It was the sense of the meeting to make the project of national interest, and a future congress will be asked to make an appropriation for the carrying out of plans to be formulated and agreed upon at the St. Louis convention.

The scheme is to put Chicago and the other commercial centers of the great lakes in more direct waterway communication with the Orient via the Mississippi river, the gulf and the proposed Panama canal. It has been ascertained by a preliminary survey that an appropriation of $31,000,000 will be necessary for a deep-water channel from Chicago to St. Louis, and the plan now is to get the country and the government interested in the execution of the project to that extent as a sort of prelude to the realization of the enterprise.

The Chicago drainage canal is already 21 ft., but it is necessary to make the Illinois river and the Mississippi 14 feet deep. The next session of the forty-ninth congress will be asked to make an appropriation for the inauguration of certain preliminary work on the Chicago drainage canal. Members of the Illinois delegation are enthusiastic over the proposition and hope to enlist the active co-operation of every section of the country interested in the greater development of America's waterways.

## YARROW-NAPIER MOTOR BOAT.

The Yarrow-Napier, the combined product of the Napier and Yarrow interests abroad, which is expected to supersede the successful Napier II, the winner of the international cup last year, as the premier motor boat of England, has been put overboard. She will be the main dependence of the English yachtsmen in the international race against E. J. Schroeder's Dixie, which has challenged, and is going abroad to race for the trophy. The Yarrow-Napier is of lighter construction than Napier II, the Saunders system being employed throughout in her construction.

The engines, installed by Yarrow, are similar to those in Napier II, and are mounted on a single bearer running from end to end of the boat. The two exhaust sides are together in the middle of the boat, and the exhaust gases pass into a common receiver, into which the circulating water passes. The exhaust can then pass down through the bottom of the boat under water, or, by opening baffle-plates, go out of the funnel. This makes the boat resemble a steamboat, owing to the steam emitted from the exhaust, but she is practically silent. The steerman's seat is on a petrol tank situated on the after deck. The motive power consists of two four-cylinder marine motors, driven on to separate propellers, and developing about 75 horsepower each. These engines have different directions of rotation, and only one is fitted with a reverse gear, the other having an ordinary Napier clutch. In starting up only one engine is started, and when the boat is under way the clutch of the other engine is let in and the action of the water on the propeller is sufficient to turn the second engine around, so that she will start when the switch is put in.

The engine body, including the upper half of the crank case, is cast in one piece, and cast iron liners are fitted to form the cylinder walls. Water-cooled heads are fitted to each pair of cylinders carrying the valves, inlet ones being worked by tappet rods off the cam shafts.

These engines are specially designed for fast running, and weight has been cut down to a minimum, although, owing to the care that has been taken in balancing all the parts and selecting the quality of material, they are amply strong enough for the work. The lubrication, which plays such an important part in these high-powered engines, has been carefully studied, and the lubrication of all parts is adequately provided for. All controlling apparatus is situated in the after end of the engines and within easy reach of the engineer, who is guided in his various adjustments by the relative speed of the engines, which are shown by separate tachometers fitted to them.

## NEW LINE OF RUSSIAN STEAMSHIPS.

The first regular line of freighters ever established between the ports of San Francisco and Vladivostok, is soon to go into effect. A Russian line of steamships is to be operated between San Francisco and the Siberian coast, and the first vessel is expected to reach the port named on or about June 1. Lieut. V. Pavlov, formerly of the Russian navy, has just arrived from the orient on the Japanese steamship Nippon Maru and he brings the news of the establishment of the new Russian line. Lieut. Pavlov is now on his way to St. Petersburg to complete the organization of the company that is to operate the steamers. The vessels will ply between the ports of Vladivostok and San Francisco, and at first will engage exclusively in the freight trade. Later, passengers will be carried by the steamers.

The new company which Lieut. Pavlov represents, at present owns two steamers, one of 7,000 tons capacity, the other of 5,000 tons burden. Both of these steamers are now plying between Vladivostok and Odessa. It is the purpose of the new company to build ten steamers to engage in trade between Vladivostok and San Francisco and also to run to Australia.

## SAILING SHIPS BEWEEN NEW YORK AND SOUTH AFRICA.

The *Cape Times* says that a line of ships has been started to ply between New York and South African ports in competition with the lines represented in the shipping conference. Hitherto, the Colonial Oil Co., which imports about 5,000 tons a month, has had all its work done by the shipping conference (British), but freights were raised, and, accordingly, by arrangement with the Standard Oil Co. it now has inaugurated a service of sailing ships to transport oil at the old rates, and to take general cargo at a rate $2.50 cheaper than the present conference rates. If the conference should succeed in preventing the ships getting general cargo, the service will go on even if the price of oil in South Africa has to be raised.

Capt. Lee Kimball, of Scranton, Miss., has secured a contract to build an ocean-going steamer for the use of the bar pilots of Sabin, Tex. The new steamer is to be 95 ft. long, 18 ft. beam and will cost about $20,000.

A bill to appropriate $100,000 for the establishment of a lighthouse on Rock of Ages, Lake Superior, has been approved in committee at Washington.

## REPUBLIC BELTING & SUPPLY CO.

The rapidly expanding business of the Republic Belting & Supply Co., of Cleveland, formerly the Bodifield Belting Co., has necessitated their leasing the Sherburne building at the corner of Seneca and Michigan streets. This is a large, substantial, pressed brick building of mill construction, and in good central location, handy to all depots, insuring quick delivery out of town, and also in close proximity to the docks. They have already let the contract for a five-story addition to the building which will give them a commodious structure. They have purchased a large quantity of the latest improved belting machinery and expect to have it installed by May 1. This will enable them to largely increase their output in leather belting, which is now very large, as they are distributing more leather belting within a radius of 300 miles of Cleveland than any other manufacturer in the country.

They expect to do a much larger business in the mechanical rubber goods as they have recently entered into a contract with the Republic Rubber Co. to be the exclusive representatives on their line of mechanical rubber goods. The Republic Rubber Co.'s name has been rapidly coming to the front as manufacturers of a very high class of steam and water hose, valves, etc. They are today furnishing air-brake hose to nearly every railway in the United States. They have built an organization of the most experienced factory managers and salesmen. President of the company Mr. Arms was formerly president of the American Sheet Steel Co.

It was due to making a connection with the Republic Rubber Co., and the desire to more fully convey to the public the line they were carrying that the Bodifield Belting Co. decided to change its name to the Republic Belting & Supply Co. A line of supplies was also added at the time this contract was made and is under the management of Mr. F. J. Mau, late of the Geo. Worthington Co. This includes everything along the line of mill, mine, railroad and vessel supplies. The organization is composed entirely of young men and they are aiming to build up an organization that will deliver goods of quality, give prompt dispatch and quote prices that will secure the business, all things being considered. The officers are: E. C. McKay, president and general manager; S. C. Cutler, vice president; S. H. Moore, secretary and treasurer.

## INCREASED PROFIT TO FOREIGN LINES.

Editor MARINE REVIEW:—Here we are, practically, without an American ocean marine, and nearly $3,000,000,000 worth of imports and exports to be carried every year, while the Kosmos Shipping Co., of Hamburg, pays a dividend of 14 per cent for 1905, as against 10 per cent in 1904. The reason for the increased profit is reported as because of the "prosperous development of the traffic to South America, especially to Chile, Peru, and the West Pacific coast in general." The report continues, "The growth of the South American trade is so enormous that competition is regarded with equanimity."

It is hoped that our house of representatives will not continue to "regard with equanimity" the fact that, for want of ships, Germany and other countries are getting many millions of the South American trade each year (almost each month) which geographically belongs to us. We have to spend money and worry to keep things on the equilibrium in South America, and, till we get ships, mainly for the benefit of other countries trading there. Why not stop it?

WALTER J. BALLARD.

W. A. Boole & Son, Oakland, Cal., are to install an oil-burning plant in the United States steamer General Mifflin at a cost of $3,725.

## INTERPRETATION OF CUBAN COASTWISE LAWS.

The state department has received from the owners of the American steamship Cristobol Colon, a protest against the action of the Cuban government in requiring them to take out a Cuban register for the vessel as a condition to plying between Batabano, Cuba, and the Isle of Pines. The plea is made that this tariff is open to American shipping on the same terms as Cuban vessels under an order made by Gen. Wood when he was governor of the island of Cuba.

The department has taken the matter under advisement. Its disposition is to regard the Isle of Pines as part of Cuba, but this contention is new, in that it disregards the question of title to the Isle of Pines and relies simply upon the vitality of an order made by the intervening military power, which under the terms of the Platt amendment and the Cuban constitution was to be continued in force indefinitely. If this contention is held to be well taken the Cuban coastwise laws will not be operative as against American shipping.

## AN AMERICAN SCHOONER AT MANILA.

Editor MARINE REVIEW:—It is refreshing to us shipless Americans to read of the arrival at Manila, of the American schooner David Evans, sixty-nine days out from Everett, Wash., with nearly 2,000,000 ft. of American lumber aboard. As we cannot get ocean-going steamships we must rejoice that any American ship, no matter how small, arrives anywhere abroad, carrying American goods. The David Evans is only a little one, 821 tons gross, but it is one. For that we must be thankful, get out our old records, and revel, in retrospection, over the days when the "yankee skipper and his crew" were often welcomed in foreign ports.

On the same day, three foreign steamships, loaded with foreign goods, also arrived at our busy port of Manila. That news is not nearly so refreshing.

WALTER J. BALLARD.

## IMPROVEMENTS AT ASHTABULA HARBOR.

During the past week plans were submitted to a board of government engineers by the Lake Shore railway for the improvement of its dock facilities at Ashtabula. These plans are of the most comprehensive character and involve practically the entire use of the harbor out to the government line on the Lake Shore side of the harbor. The plans were thoroughly gone over by the board of government engineers, consisting of Col. G. J. Lydecker, of Detroit, Lieut. Col. Dan C. Kingman, of Cleveland; Major George Zinn, of Wheeling, W. Va.; and Capt. Charles Kellar, of Detroit. Those who went over the plans with Chief Engineer Samuel Roswell, of the Lake Shore railway, were Mr. Harry Coulby, of the Pittsburg Steamship Co.; Mr. H. G. Dalton, of Pickands, Mather & Co.; Mr. W. M. Fencke, of J. W. Ellsworth & Co., and John P. Manning, the Lake Shore's dock agent at Ashtabula.

It is understood that the new docks contemplated are so extensive as to require an additional breakwater which, however, will be constructed by the railway company at its own expense. It is understood that about $3,000,000 is involved in the improvements. The Pennsylvania side of the harbor will also be extensively improved, but these plans are not, as yet, sufficiently developed to be discussed.

A ship's bell was presented to the cruiser Des Moines last week by the citizens of that city. The gift was tendered by Mayor George W. Mattson and accepted by Com'dr. W. Halsey.

## ADVERSE REPORT TO 22-FT. CHANNEL.

In a report just filed by the secretary of war, Lieut. Col. Charles E. L. Davis and Col. G. J. Lydecker, reported adversely on the proposition to provide either a 22-ft. or 25-ft. channel through connecting waters of the great lakes between Chicago, Duluth and Buffalo. The cost of the proposed channels will be as follows:

| | 22 feet. | 25 feet. |
|---|---|---|
| St. Mary's river | $2,465,000 | $11,606,237 |
| Lake Huron to Detroit river | 1,080,720 | 2,334,180 |
| Detroit river (Plan A, east route) | 4,115,430 | 11,571,450 |
| Gray's reef passage | 77,220 | 426,500 |
| Total | $7,738,970 | $25,938,367 |

The table shows that the 22-ft. channel would cost $7,738,000, and the 25-ft. channel $25,938,367. In addition to this there would be the cost of deepening the harbors to accommodate the added draught. The Lake Carriers' Association will be invited to submit arguments in opposition to the report of the engineers, Col. Davis so communicating to President Livingstone. No arguments in opposition, however, will be submitted, the executive committee of the Lake Carriers' Association being quite content with the plans of the engineers.

The report submitted to the secretary of war recommends that work now contracted for and in process of completion in the lower Detroit river be completed, and that then a new channel 22 ft. deep and 300 ft. wide out to Bar point and 800 ft. wide thence to deep water and Lake Erie be excavated at an estimated cost of $6,670,950 or $1,555,520 more than the present 20-ft. channel. This new channel would pass west of Bois Blanc island and would reach from Bar point shoal light to the main river above Stony island, a distance of about seven miles. In his letter to President Livingstone, Col. Davis quotes as follows from his report:

"For the past thirty years there have been dredging operations going on at the mouth of the Detroit river, and although the nominal width has been ample for the purposes of navigation, one-half of this width has been taken up for a considerable distance by dredges and drilling plants, and particularly has this been the case at the Lime Kiln crossing, where the channel is crooked and the bottom rocky. It has therefore, seemed best to me to let the work on Plan A be completed on the lines of the present project, and then turn it over to commerce, when for the first time since improvement started, this channel will be available for its entire width:

"If the new channel (Plan B east route) be excavated to a depth of 22 ft. and a width of 300 ft. out to Bar point, and a width of 800 ft. thence to deep water in Lake Erie, the cost will be $6,670,950, or $1,555,520 more than deepening Plan A east route to 22 ft., and it will have the very great advantage that it can be excavated as a whole and completed the full width with no interruption from passing vessels, and turned over to the use of navigation in from four to five years, and then be used for down-bound vessels only, the channel A to be used for up-bound craft, thus lessening very materially the dangers of a blockade resulting from a collision. In the event of a collision in either channel, the other may be used temporarily by vessels going in both directions during the removal of the obstruction in the blockaded channel.

"Channel B is preferred to channel D because it has no turn at the upper end and is $2,644,620 cheaper, channel C is entirely in American waters and would no doubt be very acceptable to local interests, but as an examination of the chart will show, it has many turns and will require numerous range lights, and besides has the great disadvantage of being crossed by a railroad drawbridge between Slocum's island and Grosse Ile.

"After carefully considering the situation and the estimates, I have come to the conclusion not to recommend the deepening of the main channels to either 22 feet or 25 feet at present, but to leave the question of deepening this main waterway and the harbors tributary thereto for future consideration. In reaching this conclusion I have also been influenced by the fact that in 1895 the levels of the lower lakes reached an unprecedentedly low stage, but since then have shown a decided tendency to resume their normal stages, and it looks as though for some years satisfactory depths will be maintained.

"I do, however, strongly recommend the making of the new channel of 22 ft. plan B east route, as in my opinion a second channel is now needed at the mouth of the Detroit river and will be very much needed before it can be completed, if anything like the rate of increase of traffic of late years is maintained."

On this report Col. Lydecker remarked as follows:

"Where navigation in both directions is confined to a single channel, a clear width of not less than 800 feet is required in order that vessels may meet and pass with a reasonable degree of safety, or without great risk of collision that may cause a complete blockade of navigation. But a single channel of such width cannot be conveniently provided in certain localities, and the alternative for safety in such cases must be separate channels for up and down bound commerce. This condition exists in the lower Detroit river, and for this reason is it highly important that the work of making a second channel there, that will pass to the westward of Bois Blanc island, should be commenced without delay. It is suggested, however, that further investigation may show that it is advisable to make some slight changes in the location and limiting lines referred to in that recommendation and shown on the map as plan B.

"The foregoing considerations lead to the opinion that any modification of the existing project for the 20-foot ship channel, with a view to increasing the depth to 22 or 25 ft., should be deferred until it be plainly shown that a safe and reliable 20-ft. channel is not equal to the necessities of lake commerce; and that, in the meantime, the best interests of the existing commerce require the speediest possible completion of the 20-ft. channel in the manner indicated. It is therefore recommended that congress approve, and provide for, only such modification of the present project of improvement as will secure this result."

Col. Davis in discussing the subject said in an interview:

"We believe it wise to finish what we are doing in the Detroit river and then to excavate the new channel contained in plan B. The recommendation is that the twenty-two ft. and twenty-five ft. channel plan be deferred. Well-informed vessel owners have stated that the limit of size of vessels which can be operated to advantage has been closely approached, and our position is this: Finish the twenty foot channel now under construction, and then wait awhile until we see what the result may be.

"It has also been stated that terminal facilities at lake ports are proving inadequate to care for the great cargoes which are now being dumped on the docks from a single vessel. This presents an economical problem which should be watched before going further with lake channels."

---

On April 5, 6, and 7 a convention will be held in New Orleans by various commercial organizations to form plans for a systematic co-operation of the manufacturing and transportation interests of the great Mississippi valley towards the improvement of the gulf ports.

---

Mr. W. H. Follette, of Tonawanda has leased the Cady dry dock and ship yard at Lockport, N. Y., and will make extensive repairs in the yard.

# Buyers' Directory of the Marine Trade

**For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by The Marine Review, Cleveland.**

**See accompanying index of Advertisers for full addresses of concerns in this directory.**

**AIR COMPRESSORS, AIR HOISTS, ETC.**
Great Lakes Engineering Works.....Detroit.
Mietz, Aug. .....New York.

**AIR PORTS, DEAD LIGHTS, ETC.**
Marine Mfg. & Supply Co.....New York.

**AIR PUMPS AND APPLIANCES.**
Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

**ANCHORS.**
Bowers, L. M. & Co.....Binghamton, N. Y.

**ANTI-FRICTION METALS.**
Cramp, Wm. & Sons.....Philadelphia.

**ARTIFICIAL DRAFT FOR BOILERS.**
American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit
Great Lakes Engineering Works.....Detroit

**ASH EJECTORS.**
Great Lakes Engineering Works.....Detroit.

**ATTORNEYS AND PROCTORS IN ADMIRALTY.**
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Jenkins, Russell & Eichelberger....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon Cleveland

**BAROMETERS, MARINE GLASSES, ETC.**
Ritchie, E. S. & Sons.....Brookline, Mass.

**BELTING (LEATHER).**
Republic Belting & Supply Co.....Cleveland.

**BLOCKS, SHEAVES, ETC.**
Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

**BOAT BUILDERS.**
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

**BOILER COMPOUNDS.**
The Bird-Archer Co..... .. New York
Dearborn Drug & Chemical Works....Chicago.

**BOILER MANUFACTURERS.**
Almy Water Tube Boiler Co..Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Dearing Water Tube Boiler Co.....Detroit.
Detroit Ship Building Co.....Detroit.
East End Boiler Works.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Works....
.....Oswego, N. Y.
Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.

**BOILER MANUFACTURERS—Continued.**
Mosher Water Tube Boiler Co....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co....
.....Duluth, Minn.
Quintard Iron Works Co.....New York.
Roberts Safety Water Tube Boiler Co....
.....New York.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.

**BOILER RIVETS.**
Bourne-Fuller Co.....Cleveland.

**BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.**
Falls Hollow Staybolt Co..Cuyahoga Falls, O.

**BRASS AND BRONZE CASTINGS.**
Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati.

**BRIDGES, BUILDERS OF.**
Scherzer Rolling Lift Bridge Co.....Chicago.

**BUCKETS, ORE AND COAL.**
Brown Hoisting & Conveying Machine Co.
..... Cleveland.

**BULKHEAD DOORS, WATERTIGHT.**
"Long Arm" System Co.....Cleveland.

**CABIN AND CABINET FINISHING WOODS.**
Martin-Barriss Co.....Cleveland.

**CANVAS SPECIALTIES.**
Baker & Co., H. H.....Buffalo.
Bunker, E. A. .....New York.
Upson-Walton Co.....Cleveland.
Republic Belting & Supply Co.....Cleveland.

**CAPSTANS.**
American Ship Windlass Co..Providence, R. I.
Dake Engine Co.....Grand Haven, Mich.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

**CEMENT, IRON FOR REPAIRING LEAKS.**
Smooth-On Mfg. Co.....Jersey City, N. J.

**CHAIN CONVEYORS, HOISTS.**
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.
General Electric Co.....Schenectady, N. Y.

**CHAIN HOISTS.**
Boston & Lockport Block Co....Boston, Mass.
Republic Belting & Supply Co.....Cleveland, O.

**CHARTS.**
Penton Publishing Co.....Cleveland.

**CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.**
Ritchie, E. S. & Sons.....Brookline, Mass.

**COAL PRODUCERS AND SHIPPERS.**
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

**COAL AND ORE HANDLING MACHINERY.**
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.

**COMPASSES.**
Ritchie, E. S. & Sons.....Brookline, Mass.

**CONDENSERS.**
Great Lakes Engineering Works.....Detroit.
Thropp & Sons Co., John E...Trenton, N. J.

**CONTRACTORS FOR PUBLIC WORKS.**
Breymann & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Hubbell Co., H. W.....Saginaw, Mich
Lake Superior Contracting & Dredging Co.,
..... Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H..Milwaukee.
Sullivan, M.....Detroit.

**CORDAGE.**
Baker & Co., H. H.....Buffalo.
Upson-Walton Co.....Cleveland.

**CORK JACKETS AND RINGS.**
Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.

**CRANES, TRAVELING.**
Brown Hoisting Machinery Co.....Cleveland.

**DIVING APPARATUS.**
Morse, A. J. & Son.....Boston.
Schrader's Son, Inc., A..... ... New York.

**DREDGING CONTRACTORS.**
Breymann & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Hubbell Co., H. W.....Saginaw, Mich
Lake Superior Contracting & Dredging Co.
..... Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H..Milwaukee.
Sullivan, M.....Detroit.

**DREDGING MACHINERY.**
Quintard Iron Works Co.....New York.

**DRY DOCKS.**
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co....Superior, Wis.
Tietjen & Lang Dry Dock Co.....Hoboken, N. J

**DREDGE BUILDERS.**
Manitowoc Dry Dock Co.....Manitowoc, Wis.

**DYNAMOS.**
General Electric Co.....Schenectady, N. Y
Mietz, Aug.....New York.
Thropp & Sons, John E.....Trenton, N. J.

**ELECTRIC HOISTS AND CRANES.**
General Electric Co.....Schenectady, N. Y.

# WANTED and FOR SALE Department.

## PROPOSALS.

U. S Engineer Office, Detroit, Mich., March 10, 1906 Sealed proposals for dredging Rouge River, Mich., will be received here until 3:00 P. M., April 10, 1906, and then publicly opened. Information furnished on application. CHARLES KELLER, Capt., Engrs.

## FOR SALE.

# FOR SALE

### Second Hand

Two only, 9 x 14, Davenport Locomotives. 25 four yards one way dump cars, of "Ryan and McDonald" mfr. All in good condition.

**The Geo. Worthington Co.**

**Cleveland, Ohio.**

### For Sale.

Square fire box marine boiler. Built 1898, 8 ft. 6 in. wide, 13 ft. long. Allowed 130 lbs pressure. American inspection. For further particulars apply to F. E. HALL, Trenton, Ont., Can.

### A Bargain.

Steamer E. F. Gould, length 137 ft., width 28 ft, depth 8 ft. 5 in, tonnage 261 tons. Boiler, engine and hull in good condition. First-class, complete sand pumping outfit now installed on boat, will sell with boat if so desired. Apply

JOHN M. McKERCHEY,
Detroit, Mich.

## FOR SALE.

### FOR SALE.
### Delivery Boat "I-No-U."

We want to sell our delivery boat because we have no further use for her.

She commenced service a new boat in the Spring of 1904. We built her by the day and of the best material we could buy. Cost $2,000. Hull 38½ ft. long, 8½ ft. beam. Frames 2" x 3" at bottom and 2" x 2" at top and spaced 12" from center to center.

For a distance of eight feet alongside of engine there is an intermediate frame. Keel is 5¼" x 10½". Planking and ceiling 1⅛" thick. All White Oak. Engine, 15 H. P. Lacy Single Cylinder Four Cycle. Turns a 34" wheel 300 R. P. M. Speed 8½ miles per hour. Send for photo. We think she is the best built Delivery Boat on the lakes and believe you would be of the same opinion if you saw her. If you need a delivery boat buy a good one and avoid spending a lot of money every winter in repairs, etc.

Address

THE HARDY & DISCHINGER CO.,
Oils & Supplies,
Toledo, Ohio

### A Bargain.

Steamer "Huntress," built in 1880, tonnage 114, length 110 ft., beam 18 ft., draft 7½ ft., carries 215 passengers Hull and boiler in good condition. For sale at a bargain. Apply for information to SMITH, DAVIS & CO., 200 Main St., Buffalo, N. Y.

### FOR SALE.

One combination Clamshell and Dipper Dredge. Machinery for clamshell dredge. A dipper dredge partly burned. Deck scow 112 x 32 x 9 Tug—14 x 16. Several dredge dippers. Three 100 yd. dump scows. Miscellaneous appliances. Office with safe and fixtures, all to be closed out cheap.

**CARKIN, STICKNEY & CRAM,**

**DETROIT, MICH.**

## FOR SALE.

### For Sale or Charter.

Fish tug Enterprise, built 1888, rebuilt 1904, 50 x 14 ft., engine 10½ x 12, boiler 52" x 8 ft., 120 lb. steam pressure.

CHAS. DAHLKE,
208 American Trust Bldg.,
Cleveland, O.

### Boiler.

Marine Boiler for sale cheap; shell 6 x 12 ft., 90 lbs. steam.

GEO. A. DOUGLASS,
1295 River St., Detroit, Mich.

### For Sale.

Steamer Columbia, length 115 ft., beam 21 ft. Steamer Crescent, length 80 ft., beam 16 ft. For further information apply to C. A. Webb, Traverse City, Mich.

### For Sale.

Five Scotch Boilers, allowed 160 lbs. steam. Good as new. ERIE MACHINERY CO., 729 Garfield Bldg., Cleveland O.

## WANTED

### Wanted.

Wanted to charter, with option of purchasing, a propeller or side wheel steamer 120 to 130 ft. keel, 5 to 5½ ft draft. Capacity 200 passengers and 50 to 60 tons freight. Address

TURBINE STEAMSHIP COMPANY,
Hamilton, Canada.

## WRECKING.

### Wrecking.

The powerful ice-breaker Algomah lies at dock at St. Ignace under constant steam ready for a call on the lakes at any moment.

ISLAND TRANSPORTATION CO.,
St. Ignace, Mich. L. R. Boyton, Mgr.

**THAT'S OUR BUSINESS**

Buying, Selling, Chartering BOATS.

If you desire to charter, sell or buy let us help you.

**CHICAGO STEAMER EXCHANGE,**
No. 2 Rush Street.
Long Distance Phone Cent. 5046. **CHICAGO.**

## A Handy Little Chart of the Great Lakes

**Mounted on Linen.** 10½ X 15 INCHES. **Price Postpaid, 25 cts.**

Clearly showing every port on the Great Lakes from Clayton to Duluth. It is small enough to fold up and carry in the coat pocket or pigeon hole of a desk, and is also very suitable for framing.

With this little chart near at hand, you save the trouble of stepping to a chart case and taking out a great big three-foot square chart that is awkward to handle.

***The Most Accurate Small Chart Ever Published.***

FOR SALE BY

***THE MARINE REVIEW, - - CLEVELAND.***

# Buyers' Directory of the Marine Trade.—*Continued.*

**ELECTRIC LIGHT AND POWER PLANTS.**
General Electric Co.....Schenectady, N. Y.
Mietz, Aug. .....New York.
Thropp & Sons, John E.....Trenton, N. J.

**ENGINE BUILDERS, MARINE.**
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Shipbuilding Co....Quincy, Mass.
Great Lakes Engineering Works.Detroit, Mich.
Hall Bros. .....Philadelphia.
Lockwood Mfg. Co.....East Boston, Mass.
Maryland Steel Co.....Sparrows Point, Md.
Mietz, Aug.....New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co...
..... Duluth, Mich.
Quintard Iron Works Co.....New York.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.

**ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.**
Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co.....New York.

**ENGINEERING SPECIALTIES AND SUPPLIES.**
Lunkenheimer Co. .....Cincinnati.
Northwestern Steam Boiler & Mfg. Co...
..... Duluth, Minn.

**ENGINEERS, MARINE, MECHANICAL, CONSULTING.**
Hynd, Alexander .....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph.....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Roelker, H. B. .....New York.
Wood, W. J. .....Chicago.

**FEED WATER PURIFIERS AND HEATERS.**
Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.
Ross Valve Co.....Troy, N. Y.

**FIXTURES FOR LAMPS, OIL OR ELECTRIC.**
General Electric Co.....Schenectady, N. Y.

**FORGES.**
Sutton Co., C. E.....Toledo, O.

**FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.**
Cleveland City Forge & Iron Co...Cleveland.
Fore River Shipbuilding Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

**FLUE WELDING.**
Fix's, S. Sons.....Cleveland.

**FUELING COMPANIES AND COAL DEALERS.**
Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit.

**FURNACES FOR BOILERS.**
Continental Iron Works.....New York.

**GAS BUOYS.**
Safety Car Heating & Lighting Co..New York.

**GAS AND GASOLINE ENGINES.**
Chase Machine Co.....Cleveland.

**GAUGES, STEAM AND VACUUM.**
Lunkenheimer Co. .....Cincinnati.

**GAUGES, WATER.**
Lunkenheimer Co. .....Cincinnati, O.

**GENERATING SETS.**
General Electric Co.....Schenectady, N. Y.

**GRAPHITE.**
Dixon Crucible Co., Joseph..Jersey City, N. J

**GREASE EXTRACTORS.**
Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.

**HAMMERS, STEAM.**
Chase Machine Co.....Cleveland.

**HEATING APPARATUS.**
Sutton Co., C. E.....Toledo, O.

**HOISTS FOR CARGO, ETC.**
American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
General Electric Co.....New York.
Georgian Bay Engineering Works.....
.....Midland, Ont.
Hyde Windlass Co.....Bath, Me.
Marine Iron Co.....Bay City.
Mietz, Aug. .....New York.

**HOLLOW SHAFTINGS, IRON OR STEEL.**
Falls Hollow Staybolt Co...Cuyahoga Falls, O.

**HOLLOW STAYBOLT IRON.**
Falls Hollow Staybolt Co...Cuyahoga Falls, O.

**HYDRAULIC DREDGES.**
Great Lakes Engineering Works.....Detroit.

**HYDRAULIC TOOLS.**
Watson-Stillman Co., The.....New York.

**ICE MACHINERY.**
Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

**INJECTORS.**
American Injector Co.....Detroit.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

**INSURANCE, MARINE.**
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., E. J.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F..New York & Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

IRON CASTINGS.
Sutton Co., C. E.....Toledo, O.

**IRON ORE AND PIG IRON.**
Bourne-Fuller Co.....Cleveland, O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

**LAUNCHES—STEAM, NAPHTHA, ELECTRIC.**
Truscott Boat Mfg. Co.....St. Joseph, Mich.

**LIFE PRESERVERS, LIFE BOATS, BUOYS.**
Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D.....New York.

**LIGHTS, SIDE AND SIGNAL.**
Russell & Watson .....Buffalo.

**LOGS.**
Nicholson Ship Log Co.....Cleveland.
Walker & Sons, Thomas....Birmingham, Eng.
Also Ship Chandlers.

**LUBRICATING GRAPHITE.**
Dixon Crucible Co., Joseph..Jersey City, N. J.

**LUBRICATORS.**
Lunkenheimer Co. .....Cincinnati

**LUMBER.**
Martin-Barriss Co.....Cleveland.

**MACHINISTS.**
Chase Machine Co.....Cleveland.
Hickler Bros.....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.

**MACHINE TOOLS (WOOD WORKING).**
Atlantic Works, Inc.....Philadelphia.

**MARINE RAILWAYS.**
Hickler Bros.....Sault Ste. Marie, Mich.

**MARINE RAILWAYS, BUILDERS OF.**
Crandall & Son, H. I.....East Boston, Mass.

**MATTRESSES, CUSHIONS, BEDDING.**
Fogg, M. W.....New York.

**MECHANICAL DRAFT FOR BOILERS.**
American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.

**METALLIC PACKING.**
Katzenstein, L. & Co.....New York.
The National Metallic Packing Co....Oberlin, O

**MOTORS, GENERATORS—ELECTRIC**
General Electric Co.....Schenectady, N. Y.

**NAUTICAL INSTRUMENTS.**
Benjamin Farnum How.....Boston
Ritchie, E. S., & Sons.....Brookline, Mass.

**NAVAL ARCHITECTS.**
Hynd, Alexander .....Cleveland.
Kidd, Joseph .....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Wood, W. J. .....Chicago.

**OAKUM.**
Stratford, Oakum Co.....Jersey City, N. J.

**OIL ENGINES.**
Mietz, Aug. .....New York.

**OILS AND LUBRICANTS.**
Dixon Crucible Co., Joseph..Jersey City, N. J.
Standard Oil Co.....Cleveland.

**PACKING.**
Jenkins Bros. .....New York.
Katzenstein, L. & Co.....New York.
The National Metallic Packing Co....Oberlin, O.
Republic Belting & Supply Co.....Cleveland, O.

**PAINTS.**
Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co. .....Cleveland.

**PATTERN SHOP MACHINERY.**
Atlantic Works, Inc.....Philadelphia.

# Buyers' Directory of the Marine Trade.—*Continued.*

### PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Hubbell Co., H. W.....Saginaw, Mich.
Lake Superior Contracting & Dredging Co. ..... Duluth, Minn.
Parker Bros. Co., Ltd.....Detroit.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H..Milwaukee.
Sullivan, M..... Detroit

### PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland, O.
Macbeth Iron Co.....Cleveland.
Reading Iron Co.....Reading, Pa.

### PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

### PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

### PRESSURE REGULATORS.

Ross Valve Co.....Troy, N. Y.

### PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co.....Bath, Me.
Lockwood Mfg. Co. .....East Boston, Mass.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co..... .....Newport News, Va.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp & Sons Co., J. E.....Trenton, N. J.
Trout, H. G.....Buffalo.

### PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.

### PUMPS FOR VARIOUS PURPOSES.

Great Lakes Engineering Works.....Detroit.
Marine Iron Works.....Chicago.
Kingsford Foundry & Machine Works..... .....Oswego, N. Y.

### PUNCHES AND SHEARS.

Sutton Co., C. E.....Toledo, O.

### RANGES.

Stamford Foundry Co.....Stamford, Conn.

### REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

### REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Cleveland.

### RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland, O.

### RUBBER SUPPLIES.

Republic Belting & Supply Co.....Cleveland, O.

### SAFETY VALVES.

Lunkenheimer Co. .....Cincinnati.

### SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

### SALVAGE COMPANIES.

See Wrecking Companies.

### SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.

### SHAFTING, HOLLOW.

Falls Hollow Staybolt Co..Cuyahoga Falls, O.

### SHEARS.

See Punches, and Shears.

### SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

### SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co..... .....Newport News, Va.
New York Shipbuilding Co....Camden, N. J.
Roach's Ship Yard.....Chester, Pa.
Shipowner's Dry Dock Co.....Chicago.

### SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
Marine Mfg. & Supply Co.....New York.
Upson-Walton Co.....Cleveland.

### SHIP DESIGNERS.

Kidd, Joseph .....Duluth.
Steel, Nacey & Hynd.....Cleveland.
Wood, W. J.....Chicago.

### SHIP LANTERNS AND LAMPS.

Russell & Watson.....Buffalo.

### SHIP TIMBER.

Martin-Barriss Co.....Cleveland.

### SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

### STAYBOLT IRON OR STEEL BARS, HOLLOW OR SOLID.

Falls Hollow Staybolt Co..Cuyahoga Falls, O.

### STEAM VESSELS FOR SALE.

Holmes, Samuel .....New York.
Lester, S. S.....Quebec, Can.
McCarthy, T. R.....Montreal, Can.

### STEAMSHIP LINES, PASS. AND FREIGHT.

American Line .....New York.
Anchor Line .....Buffalo.
Boston Steamship Co.....Boston.
Cleveland & Buffalo Transit Co.....Cleveland.
International Mercantile Marine Co..... ..... Philadelphia.
Mallory Line ..... .....New York.
Merchants' Montreal Line.....Montreal.
New York & Cuba Mail S. S. Co...New York.
Red Star Line.....New York.
United Fruit Co.....Boston

### STEEL CASTINGS.

Otis Steel Co.....Cleveland.
Sutton Co., C. E.....Toledo, O.

### STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.
Moulton Steering Engine Co.....New York.
Sheriffs Mfg. Co.....Milwaukee.

### SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
Schrader's Son, Inc., A..... ....New York.

### SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Hynd, Alexander .....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Nacey, James .....Cleveland.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

### TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
Lunkenheimer Co.....Cincinnati, O.

### TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Watson-Stillman Co.....New York.

### TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia

### TOWING MACHINES.

American Ship Windlass Co..Providence, R. I.
Chase Machine Co.....Cleveland.

### TOWING COMPANIES.

Donnelly Salvage & Wrecking Co..... .....Kingston, Ont.
Great Lakes Towing Co.....Cleveland.

### TRUCKS.

Boston & Lockport Block Co.....Boston.

### TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

### VALVES, STEAM SPECIALTIES, ETC.

Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Ross Valve Co.....Troy, N. Y.

### VALVES FOR WATER AND GAS.

Lunkenheimer Co.....Cincinnati.
Republic Belting & Supply Co.....Cleveland, O.
Ross Valve Co.....Troy, N. Y.

### VARNISHES.

Detroit Varnish Co.....Detroit.
Detroit White Lead Works.....Detroit.
Also Ship Chandlers.

### VENTILATING APPARATUS FOR SHIPS.

Sutton Co., C. E.....Toledo, O.

### VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., E. J.....Chicago.
Hall, John B.....Buffalo.
Helm & Co., D. T.....Duluth.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co.....Cleveland.
Lester, S. S. .....Quebec, Can.
McCarthy, T. R.....Montreal.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

### WATER GAUGES.

Lunkenheimer Co.....Cincinnati, O.

### WATERTIGHT BULKHEAD DOORS.

"Long Arm" System Co.....Cleveland.

### WHISTLES, STEAM.

Lunkenheimer Co..... Cincinnati.

### WILFORD'S WATERPROOF CLOTH.

Bunker, E. A. .....New York.

### WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

### WINDLASSES.

American Ship Windlass Co..Providence, R. I.
American Ship Building Co.....Cleveland.
Dake Engine Co..... Grand Haven, Mich.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

### WINCHES.

American Ship Windlass Co..Providence, R. I.
Georgian Bay Engineering Works..... .....Midland, Ont.
Hyde Windlass Co.....Bath, Me.

### WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

### WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co..... .....Kingston, Ont.
Great Lakes Towing Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.

### YACHT AND BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Truscott Boat Mfg. Co.....St. Joseph, Mich.

### YAWLS.

Drein, Thos. & Son.....Wilmington, Del.